Industrial Pretreatment Local Limits Evaluation Fitzgerald Creek Water Pollution Control Plant

Prepared for

Cherokee County Water & Sewerage Authority
Canton, Georgia

March 9, 2020

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List of Abbreviations

AIL	allowable industrial loading
AHL	allowable headworks loading
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
CCWSA	Cherokee County Water & Sewerage Authority
CF	Conversion Factor
CFR	Code of Federal Regulations
cfs	cubic foot/feet per second
COD	chemical oxygen demand
d	day(s)
DO	dissolved oxygen
EPA	United States Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FOG	fats, oils, and greases
kg	kilogram(s)
lb	pound(s)
LLE	Local Limits Evaluation
MAIL	maximum allowable industrial loading
MAHL	maximum allowable headworks loading
MBAS	methylene blue active substances
mgd	million gallons per day
mg/L	milligram per liter
NPDES	National Pollutant Discharge Elimination System
POC	pollutant of concern
POTW	publicly owned treatment works
SGF	safety and growth factor
TCLP	toxicity characteristic leaching procedure
TDR	total dissolved residue
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TPH	total petroleum hydrocarbons
TRC	total residual chlorine
TSS	total suspended solids
TTO	total toxic organics
USGS	United States Geological Survey
UV	ultraviolet
WQS	water quality standards
WPCP	water pollution control plant

List of Variables

1Q10	lowest average flow for a 1-day period that is expected to occur once every 10 years
7Q10	lowest average flow for a 7-day period that is expected to occur once every 10 years
AHL_{DESIGN}	AHL based on WPCP design criteria, lb/d
AHL_{NPDES}	AHL based on NPDES permit limit for effluent discharge, lb/d
AHL_{SEC}	AHL based on inhibition of secondary treatment processes, lb/d
AHL_{TER}	AHL based on inhibition of tertiary treatment processes, lb/d
AHL_{WQS}	AHL based on water quality standards, lb/d
AIL_{IU}	allowable industrial loading, lb/d
C_{DOM}	domestic and commercial background levels, mg/L
C_{HW}	concentrations in septic/hauled waste, mg/L
C_{INHIB2}	inhibition criterion for secondary treatment, mg/L
C_{INHIB3}	inhibition criterion for tertiary treatment, mg/L
C_{LIM}	uniform concentration-based local limit, mg/L
C_{NPDES}	NPDES permit limit for effluent discharge, mg/L
C_{STR}	receiving stream background concentration, mg/L
C_{WQS}	in-stream state water quality standard, mg/L
CF	conversion factor to convert dissolved to total metals fraction, unitless
DC	WPCP design criteria, mg/L
E_{WPCP}	WPCP effluent pollutant concentration, mg/L
I_r	WPCP influent pollutant concentration at headworks, mg/L
$L_{\%}$	percentage of MAHL currently utilized, percent
L_{INFL}	current influent loading (average or daily maximum), lb/d
L_{UNC}	loadings from uncontrolled sources, lb/d
PL	pollutant loading, lb/d
Q_{DOM}	domestic and commercial flow, mgd
Q_{HW}	septic and hauled waste flow, mgd
Q_{IND}	industrial flow, mgd
Q_{IU}	flow from an industrial user, mgd
Q_{NPDES}	NPDES permitted flow for effluent discharge, mgd
Q_{STR}	receiving stream (upstream) flow rate, mgd
Q_{WPCP}	WPCP average effluent flow rate, mgd
R_{PRIM}	removal efficiency from headworks to primary effluent, decimal
R_{SEC}	removal efficiency from headworks to secondary effluent, decimal
R_{WWT}	plant removal efficiency from headworks to effluent, decimal
WQS_{DISS}	WQS for the dissolved fraction, µg/L
WQS_{TOTAL}	WQS for the total recoverable fraction, µg/L

Executive Summary

Brown and Caldwell (BC) conducted a Local Limits Evaluation (LLE) in accordance with Georgia Environmental Protection Division (EPD) and the United Stated Environmental Protection Agency (EPA) for Cherokee County Water & Sewer Authority (CCWSA). This report provides guidance for the development of local limits on discharges to Cherokee County's (the County) water pollution control plant (WPCP) that receives industrial wastewater, Fitzgerald Creek WPCP. In the past, County-wide local limits were developed based on the more stringent of the recommended industrial limits for Rose Creek WPCP and Fitzgerald Creek WPCP. For this LLE, local limits were calculated separately for the two plants to provide more flexibility and because CCWSA has the ability to regulate wastewater flow from the Little River Pumping Station to both WPCPs.

In 2018, Brown and Caldwell was contracted by CCWSA to complete LLEs. This report addresses the development of local limits on industrial discharges to the Fitzgerald Creek WPCP. Important findings noted during the evaluation and recommendations for future reviews and re-evaluations are also provided.

Applied Methodology and Approach

This LLE was prepared in accordance with EPD and EPA requirements. Details on the applied methodology, assumptions, and approach used during development of the proposed new local limits for the Fitzgerald Creek WPCP are described below.

- The industrial local limits for pollutants of concern (POCs) were derived based on the following criteria:
  - Revised NPDES limits
  - EPA POC
  - Protection of receiving stream water quality due to pass-through
  - Recent detections in the influent, effluent, or industrial wastewaters
  - Updated Water Quality Standards (WQS) and sludge disposal criteria
  - Prevention of treatment plant performance problems due to process interference or inhibition
  - Prevention of hazardous sludge disposal.
- Site-specific removal efficiencies were calculated for the conventional pollutants based on Fitzgerald Creek averages of influent and effluent analytical results data from the period of November 2017 through October 2018. In addition, removal efficiencies were calculated for those non-conventional POCs detected in the influent and/or effluent samples during the same time frame. Literature values were used for POCs with no available site-specific removal efficiencies.
- Literature values were used where site-specific domestic/commercial concentrations of POCs in wastewater were not available. Background levels were assumed to be negligible when domestic/commercial levels were not available.

- Allowable headworks loadings were calculated based on the design criteria, NPDES permit limits, activated sludge and nitrification treatment inhibition, sludge disposal standards, and acute and chronic WQS.
- All inhibition thresholds were based on literature values with the median threshold value, or minimum when there was no median, to provide a conservative limit.
- Currently, sludge from the Fitzgerald Creek WPCP is land applied. CCWSA has requested and the EPA recommends the WPCP develop local limits to ensure the sludge meets "clean sludge" requirements [40 Code of Federal Regulations (CFR) 503.13]. The criteria used in calculations was the more stringent between the ceiling concentrations, cumulative pollutant loading rates, monthly average pollutant concentrations, and landfill disposal toxicity characteristic leaching procedure regulatory level.
- Georgia acute and chronic WQS are from EPD *Rules and Regulations for Water Quality Control* (Chapter 391-3-6-03). Standards that are hardness-dependent were first adjusted for hardness of the receiving stream and dissolved metals were then converted to total recoverable. The most stringent acute and chronic water quality standard for each parameter was used. Per the Little River background hardness, a level of 25 milligrams per liter (mg/L) was used for calculations.
- The average effluent flow of 11.75 million gallons per day (mgd) was based on requested flow from CCWSA. The average industrial flow of 1.175 mgd was based on 10 percent of the average effluent flow. There is no septage/hauled flow at Fitzgerald Creek WPCP. The average dry sludge to disposal of 411,305 pounds per day (lb/d) was based on a 66 percent increase in effluent flow.
- The facility is currently authorized to discharge a monthly average of 5.0 mgd and a future expansion to 11.75 mgd of advanced treated effluent to Little River under NPDES Permit GA0038555 issued by EPD. This permit became effective as of June 1, 2015 and expires on May 31, 2020. The Little River is an Arm of Lake Allatoona, located in the Coosa River basin, is designated as fishing and is the receiving water for effluent from the Fitzgerald Creek WPCP.
- Upstream water quality data was provided by CCWSA since the data from the United States Geological Survey (USGS) station was outdated. Detected concentrations were averaged to provide a background concentration per parameter. Where data were not available or parameters were not detected in Fitzgerald Creek, the upstream concentration was assumed to be negligible.
- A safety factor of 10 percent was used to adequately address data uncertainties in this LLE.

The following presents the important findings noted during the evaluation and also provides recommendations for future reviews and re-evaluations.

Important Findings of the LLE

The major findings of this LLE are listed below.

- Per EPA guidance, the average flow should be used in calculating local limits, which is currently 4.22 mgd. However, to anticipate growth and provide stricter limits, an average flow of 11.75 mgd was used in the calculations. In addition, industrial users are assumed to contribute 1.175 mgd (10 percent of the flow).
- The proposed local limits use the background stream concentrations to account for upstream sources of pollutants.
- In calculating the proposed local limits, stream hardness upstream of Fitzgerald Creek WPCP was assumed to be 25 mg/L per water quality in the Little River, WQS were adjusted accordingly.

- The current local limits used a 10 percent safety factor.
- The proposed local limits consist of 22 parameters as the current limits.
- The proposed local limits for conventional pollutants were defaulted to design criteria.

Recommendation for Future Review and Re-evaluations

Recommendations for future reviews and re-evaluations of local limits are as follows:

- Local limits should be reevaluated in the event of major changes that may affect local limits. These changes include, but are not limited to:
  - Revised NPDES limits
  - Changes associated with industrial users; for example, the addition of a new major industry
  - Significant domestic and/or commercial growth in the County
  - Additions or improvements of treatment processes occurring at the WPCPs
  - The revision of state and/or national water quality criteria
  - Changes in sludge disposal methods
  - Changes in the Industrial Pretreatment Program.

Section 1

Introduction

Cherokee County Water and Sewer Authority (CCWSA) operates the Fitzgerald Creek WPCP that will serve Cherokee County. Fitzgerald Creek WPCP is currently permitted for a flow of 5 mgd on a monthly maximum basis. Because of changes in regulatory-driven permits and Water Quality Standards (WQS), Pollutants of Concern (POCs) and local limits were re-evaluated to meet regulatory requirements, to help protect wastewater systems, personnel, and the environment, and to help maintain sludge quality.

Fitzgerald Creek WPCP was re-issued a National Pollutant Discharge Elimination System (NPDES) Permit by the Georgia Environmental Protection Division (EPD) on June 1, 2015. In accordance with Part III.A.2.c of the permit, adopted local limits must be revised to help ensure that they continue to prevent interference with the operation of the WPCP, prevent pass-through of pollutants in violation of the NPDES permit, prevent municipal sludge contamination, and prevent toxicity to life in the receiving stream.

This Local Limits Evaluation (LLE) is a technical and detailed evaluation of the local limits developed for the Fitzgerald Creek WPCP.

1.1 Project Objective

The objective of this effort was to updated industrial local limits for the Fitzgerald Creek WPCP to enforce the specific and general prohibitions as well as state and local regulations, address site-specific concerns, and provide WPCP protection limits. The specific and general prohibitions along with categorical standards are designed to provide a minimum acceptable level of control over industrial user discharges. Local limits are established to provide additional control to prevent site-specific and environmental problems due to non-domestic discharges. Therefore, this LLE used site-specific data to identify POCs that may be expected to be discharged in quantities sufficient to cause plant or environmental problems. Some of the factors considered in developing local limits included:

- Efficiency of the WPCP in treating wastes
- Compliance with NPDES permit limits
- Condition of the water body that receives treated effluent
- State and/or federal WQS that are applicable to the water body receiving treated effluent
- Retention, use, and disposal of sewage sludge
- Worker health and safety concerns.

This LLE provides documentation and reasoned guidance on the following:

- Determining POCs
- Gathering and analyzing data
- Calculating allowable headworks loadings (AHLs) for each POC based on applicable criteria
- Determining maximum allowable headworks loadings (MAHLs) and maximum allowable industrial loadings (MAILs) for each POC, and converting these loadings to local limits

- Comparing industrial loadings to MAILs to ensure that local limits meet the needs of the industries to the extent possible.

1.2 Organization of Report

This LLE report is organized into seven sections as follows:

- **Section 1** is an introduction to the LLE and describes the project objectives.
- **Section 2** describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the LLE.
- **Section 3** provides details regarding the development of local limits for Fitzgerald Creek WPCP.
- **Section 4** lists the industrial allocations.
- **Section 5** lists the final proposed local limits.
- **Section 6** provides the limitations.
- **Section 7** lists the references.

A large volume of data and calculations was utilized to complete the LLE for CCWSA, including site-specific data, literature values, and calculation spreadsheets. The tables and appendices of this LLE contain the information needed to reproduce the local limits except for the raw analytical data, which are summarized in tables. Analytical data can be made available upon request.

The following data and calculation spreadsheets can be found in the appendices to this LLE:

- **Appendix A** contains site-specific data for Fitzgerald Creek WPCP used to develop the local limits. Included in this appendix are the following:
  - Monthly average estimations for the influent and effluent flows (Table A1)
  - Monthly estimations of volumes of sludge to disposal from Fitzgerald Creek WPCP (Table A1)
  - Concentrations of conventional pollutants in influent and effluent samples collected from November 2017 through October 2018 averaging from Fitzgerald Creek WPCP (Table A2)
  - Concentrations of metals in influent and effluent samples collected between November 2017 through October 2018 averaging from Fitzgerald Creek WPCP (Table A3)
  - Concentrations of organics in influent and effluent samples collected between November 2017 through October 2018 averaging from Fitzgerald Creek WPCP (Table A4)
  - Removal efficiencies calculated for conventional pollutants, metals, and organics based on average influent and effluent concentrations from Fitzgerald Creek WPCP (Tables A2 through A4)
  - Upstream background concentrations of conventional and inorganic pollutants from the Little River, Georgia (Table A5).
- **Appendix B** contains the literature data used in the LLE when site-specific data were not available. Included in this appendix are the following:
  - Removal efficiencies for priority pollutants, including overall treatment plant removal efficiencies as well as removal efficiencies through primary, secondary, and tertiary treatment processes (Tables B1 through B4)
  - Treatment inhibition threshold levels for activated sludge and nitrification treatment (Tables B5 and B6)
  - Domestic and commercial pollutant loadings (Table B7).

- **Appendix C** contains the regulatory limits and/or criteria applicable to Fitzgerald Creek WPCP, including the following:
  - Design-based wastewater treatment plant capacity criteria (Table C1)
  - NPDES permit limits (Table C2)
  - Biosolids land application regulatory limits (Table C3)
  - WQS for Fitzgerald Creek WPCP (Tables C4 and C5)
  - Worker protection screening levels based on fume toxicity and explosivity (Tables C6 and C7).
- **Appendix D** contains the calculation worksheets used to calculate all allowable headworks loadings, allowable industrial loadings, and local limits for Fitzgerald Creek WPCP including the following:
  - Allowable headworks and industrial loadings based on design criteria, NPDES permit, activated sludge and nitrification inhibition threshold levels, sludge disposal, and acute and chronic WQS (Tables D1 through D8)
  - Summary of allowable headworks and industrial loadings (Tables D9 and D10)
  - Maximum allowable headworks loadings and local limits (Table D11).

Section 2

Pollutants of Concern: Screening and General Methodologies

This section describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the evaluation.

2.1 Screening for Pollutants of Concern

A POC is any pollutant that may be expected to be discharged to a WPCP in sufficient amounts to cause pass-through or interference or present risk to workers. Pollutants that are contributing to or known to cause operational problems (i.e., inhibition of a treatment process) are also considered POCs even if the pollutants are not currently causing permit violations. The United States Environmental Protection Agency (EPA) has identified 15 pollutants often found in WPCP sludge and effluent that it considers potential POCs. These include arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, zinc, molybdenum, selenium, 5-day biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia as nitrogen (for plants that accept non-domestic sources of ammonia). Additional POCs listed in Table 2-1 were identified using applicable EPA screening criteria contained in the EPA *Local Limits Development Guidance Manual* (EPA 2004):

- **NPDES permit limits:** These permit conditions establish the objectives that the WPCP must meet to prevent pass-through and interferences. The WPCP is required to prohibit discharge from industrial users in amounts that result in or cause a violation of any requirement of the WPCP's NPDES permit.
- **Water quality criteria:** Water quality criteria have been developed by EPA and/or EPD for protection of surface water, including the receiving waters for permitted dischargers. The WPCP does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion. However, EPA recommends that any pollutant that has a reasonable potential to be discharged in amounts that could exceed WQS or criteria should be considered a POC and evaluated accordingly.
- **Sludge quality standards:** WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. Currently, the Fitzgerald Creek WPCP hauls sludge to a local landfill. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements [40 Code of Federal Regulations (CFR) 503.13].
- **Prohibition on treatment plant interference:** The General Pretreatment Regulations prohibit any user of a WPCP from discharging pollutants that cause interference (i.e., a discharge that inhibits or disrupts a WPCP resulting in a violation of the WPCP's NPDES permit or noncompliance with the WPCP's sewage sludge requirements). EPA recommends that the WPCP consider pollutants that have previously interfered with or may potentially interfere with the treatment works' operation to be a potential POC.

- **Influent, effluent, and sludge scans at the WPCP:** EPA recommends that the WPCP conduct additional screening for any pollutant found in the priority pollutant scans of its influent, effluent, or sludge to determine whether the pollutant should be listed as a POC. Although a pollutant found in this way is a potential POC, the WPCP may determine based on the pollutant's concentration that the pollutant need not be selected as a POC for which local limits are developed.
- **Industrial discharge scans:** An additional screening was conducted to identify pollutants detected in the industrial users' discharge. Although a pollutant found in this way is a potential POC, the WPCP may determine, based on the pollutant's concentration, that the pollutant need not be selected as a POC for which local limits are developed.

In general, EPA recommends that an LLE be conducted for EPA's 15 POCs, as well as any pollutant for which the WPCP has a preexisting local limit or an applicable NPDES limit or sludge disposal limit, or that has caused inhibition or other problems in the past.

2.1.1 Pollutants of Concern

Table 2-1 provides the parameters and criteria used for this screening and identifies those pollutants for which local limits are needed based on the screening for Fitzgerald Creek WPCP.

In addition to EPA's 15 POCs, based on the above guidelines, 8 additional parameters were identified as POCs for Fitzgerald Creek WPCP. Additionally, the pollutants oil and grease and total Kjeldahl nitrogen (TKN) were also included in the evaluation.

2.2 General Methodologies

This section presents the methodology used to calculate MAHLs. A MAHL is an estimate of the upper limit of pollutant loading to a WPCP intended to prevent pass-through or interference. Methodologies for calculating MAHLs are well established in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be broken down into a three-step procedure: (1) calculation of removal efficiencies, (2) calculation of AHLs for each environmental criterion, and (3) designation of the most stringent AHL as the MAHL for each POC.

2.2.1 Calculation of Removal Efficiencies

Removal efficiency is the fraction or percentage of the influent pollutant loading that is removed from the waste stream across an entire wastewater treatment works (plant removal efficiency) or through specific wastewater treatment processes within the works (primary, secondary, and/or tertiary removal efficiencies). Removal efficiencies are based largely on site-specific conditions such as climate, WPCP design, operation and maintenance, plant conditions, and sewage characteristics.

EPA recommends that site-specific data be used to calculate removal efficiencies. Since Fitzgerald Creek WPCP is an existing treatment plant, average plant removal efficiencies were calculated from the Fitzgerald Creek WPCP available influent and effluent data from November 2017 through October 2018, as presented in Tables A2 through A4 in Appendix A.

The proposed removal efficiencies reported by other WPCPs by studies that have been published in professional journals or by EPA were used in developing local limits. These literature-based data are presented in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be found in Appendix B. Those POCs with data available to calculate site-specific removal efficiencies are discussed in further detail in Section 3.

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Conventional Pollutants											
Ammonia	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	YES
Biochemical Oxygen Demand (BOD)	Yes	Yes	No	Yes	Yes	No	No	No	No	No	YES
Chemical Oxygen Demand (COD)	No	Yes	Yes	No	Yes	Yes	No	No	No	No	YES
Phosphorus, Total (as P)	No	Yes	No	Yes	Yes	No	No	No	No	No	YES
Suspended Solids, Total (TSS)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	YES
Inorganic Pollutants											
Antimony	No	No	No	No	No	No	Yes	No	No	No	
Arsenic	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Barium	No	No	No	No	No	No	No	No	No	Yes	
Cadmium	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Chromium III	No	No	No	No	Yes	No	Yes	Yes	No	No	YES
Chromium VI	No	Yes	No	No	Yes	No	Yes	Yes	No	No	YES
Chromium, Total	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes	YES
Copper	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Cyanide	Yes	No	No	No	Yes	No	Yes	Yes	No	No	YES
Lead	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Mercury	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Molybdenum	Yes	No	No	No	No	No	No	No	No	No	YES
Nickel	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Selenium	Yes	Yes	No	No	Yes	No	Yes	No	No	Yes	YES
Silver	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Thallium	No	No	No	No	No	No	Yes	No	No	No	
Vanadium	No	No	No	No	No	No	No	No	No	No	
Zinc	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Organic Pollutants											
Acenaphthene	No	No	No	No	No	No	Yes	No	No	No	
Acenaphthene	No	No	No	No	No	No	No	No	No	No	
Acetone	No	No	No	No	No	No	Yes	No	Yes	No	
Acrolein	No	No	No	No	No	No	Yes	No	Yes	No	
Acrylonitrile	No	No	No	No	No	No	Yes	No	Yes	No	
Aldrin	No	No	No	No	No	No	Yes	Yes	No	No	
Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Aroclor 1232	No	No	No	No	No	No	Yes	No	Yes	No	
Aroclor 1242	No	No	No	No	No	No	Yes	No	Yes	No	
Aroclor 1254	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Benzene	No	No	No	No	No	No	Yes	No	No	No	
Benzidine	No	No	No	No	No	No	Yes	No	No	No	
Benzo(a)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(a)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(k)Fluoroethene	No	No	No	No	No	No	Yes	No	No	No	
Benzofluoranthene, 3,4-	No	No	No	No	No	No	Yes	No	No	No	
BHC-Alpha, a-	No	No	No	No	No	No	Yes	No	No	No	
BHC-Beta, b-	No	No	No	No	No	No	No	No	No	No	
BHC-Delta, d-	No	No	No	No	No	No	Yes	No	No	No	
Bis(2-chloroethyl)Ether	No	No	No	No	No	No	Yes	No	No	No	
Bis(2-chloroisopropyl)Ether	No	No	No	No	No	No	No	No	Yes	No	
Bis(2-chloromethyl)Ether	No	Yes	No	No	Yes	No	Yes	No	No	No	
Bis(2-ethylhexyl)Phthalate	No	Yes	No	No	No	No	No	No	No	No	YES
Bromodichloromethane	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Bromoform	No	No	No	No	No	No	Yes	No	Yes	No	
Butylbenzyl Phthalate	No	No	No	No	No	No	Yes	No	No	No	
Carbon Disulfide	No	No	No	No	No	No	No	No	Yes	No	
Carbon Tetrachloride	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane, Gamma	No	No	No	No	No	No	No	No	No	No	
Chlorobenzene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlorodibromomethane	No	No	No	No	No	No	Yes	No	No	No	
Chloroethane	No	No	No	No	No	No	No	No	Yes	No	
Chloroform	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	YES
Chloronaphthalene, 2-	No	No	No	No	No	No	Yes	No	No	No	
Chlorophenol, 2-	No	No	No	No	No	No	Yes	Yes	No	No	
Chrysene	No	No	No	No	No	No	Yes	No	No	No	
DDD, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDE, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDT, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
Dibenzo(a,h)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Dibromochloromethane	No	No	No	No	No	No	No	No	No	No	
Dichlorobenzene, 1,1-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Dichlorobenzene, 1,2-	No	No	No	No	No	No	Yes	Yes	No	No	
Dichlorobenzene, 1,3-	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	
Dichlorobenzene, 1,4-	No	No	No	No	No	No	Yes	No	No	No	
Dichlorobenzidine, 3,3-	No	No	No	No	No	No	Yes	No	No	No	
Dichlorobromomethane	No	No	No	No	No	No	No	No	Yes	No	
Dichlorodifluoromethane	No	No	No	No	No	No	Yes	No	Yes	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Dichlorofluoromethane	No	No	No	No	No	No	No	No	No	No	
Dichloroethane, 1,1-	No	No	No	No	No	No	No	No	Yes	No	
Dichloroethane, 1,2-	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Dichloroethylene, 1,1-	No	No	No	No	No	No	Yes	No	Yes	Yes	
Dichloroethylene, cis-1,2-	No	No	No	No	No	No	No	No	No	No	
Dichloroethylene, trans-1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichlorophenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Dichloropropane, 1,2-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Dichloropropane, 1,3-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichloropropylene, 1,3-	No	No	No	No	No	No	No	No	No	No	
Dieldrin	No	No	No	No	No	No	Yes	No	Yes	No	
Diethyl phthalate	No	No	No	No	No	No	Yes	No	Yes	No	
Dimethyl phthalate	No	No	No	No	No	No	Yes	No	No	No	
Dimethylphenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Di-n-butyl phthalate	No	No	No	No	No	No	Yes	No	No	No	
Dinitro-o-cresol, 4,6-	No	No	No	No	No	No	No	No	Yes	No	
Dinitrophenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Dinitrophenol, 2-Methyl-4,6-	No	No	No	No	No	No	Yes	No	No	No	
Dinitrotoluene, 2,4-	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Diphenylhydrazine, 1,2-	No	No	No	No	No	No	Yes	Yes	No	No	
Endosulfan Sulfate	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, alpha-	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, beta-	No	No	No	No	No	No	Yes	No	No	No	
Endrin	No	No	No	No	No	No	Yes	No	Yes	Yes	
Endrin Aldehyde	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Ethylbenzene	No	No	No	No	No	No	Yes	Yes	Yes	No	
Fluoranthene	No	No	No	No	No	No	Yes	No	No	No	
Fluorene	No	No	No	No	No	No	Yes	No	No	No	
Formaldehyde	No	No	No	No	No	No	No	No	Yes	No	
Heptachlor	No	No	No	No	No	No	Yes	No	Yes	Yes	
Heptachlor Epoxide	No	No	No	No	No	No	Yes	No	No	Yes	
Hexachlorobenzene	No	No	No	No	No	No	Yes	Yes	No	Yes	
Hexachlorobutadiene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Hexachlorocyclopentadiene	No	No	No	No	No	No	Yes	No	Yes	No	
Hexachloroethane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Indeno(1,2,3-cd)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Isophorone	No	No	No	No	No	No	Yes	No	No	No	
Isopropyltoluene, p-	No	No	No	No	No	No	No	No	No	No	
Lindane	No	No	No	No	No	No	Yes	No	No	Yes	
Methyl Bromide (Bromomethane)	No	No	No	No	No	No	Yes	No	Yes	No	
Methyl Chloride (Chloromethane)	No	No	No	No	No	No	No	No	Yes	No	
Methyl ethyl ketone (2-Butanone)	No	No	No	No	No	No	No	No	Yes	Yes	
Methyl tert-butyl ether	No	No	No	No	No	No	No	No	No	No	
Methylene blue active substances (MBAS)	No	No	No	No	No	No	No	No	No	No	
Methylene chloride	No	No	No	No	No	No	Yes	No	Yes	No	
Methoxychlor	No	No	No	No	No	No	Yes	No	No	Yes	
Naphthalene	No	No	No	No	No	No	No	Yes	Yes	No	
Nitrobenzene	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
N-Nitrosodimethylamine	No	No	No	No	No	No	Yes	No	No	No	
N-Nitrosodiphenylamine	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Nonylphenol	No	No	No	No	No	No	No	No	No	No	
PCBs	No	No	No	No	No	No	Yes	No	No	No	
Pentachlorophenol	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Phthalate, Di-n-octyl	No	No	No	No	No	No	No	No	No	No	
Phenanthrene	No	No	No	No	No	No	No	Yes	No	No	
Phenol	No	No	No	No	No	No	Yes	Yes	Yes	No	YES
Phenolics, Total Recoverable	No	No	No	No	No	No	No	No	No	No	
Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Silvex (2,4,5-TP)	No	No	No	No	No	No	Yes	No	No	Yes	
Tetrachloroethane, 1,1,2,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Tetrachloroethylene	No	No	No	No	No	No	Yes	Yes	Yes	No	
Toluene	No	Yes	No	No	No	No	Yes	Yes	Yes	No	
Toxaphene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Trichlorobenzene, 1,2,4-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethane, 1,1,1-	No	No	No	No	No	No	No	No	Yes	No	
Trichloroethane, 1,1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethylene	No	No	No	No	No	No	No	No	No	Yes	
Trichlorofluoromethane	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Trichlorophenol, 2,4,6-	No	No	No	No	No	No	No	No	Yes	No	
Vinyl Chloride	No	No	No	No	No	No	Yes	No	No	Yes	
Xylenes, Total	No	No	No	No	No	No	Yes	No	Yes	Yes	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Other Pollutants											
Oil & Grease	No	Yes	Yes	No	Yes	Yes	No	No	No	No	YES
Total Dissolved Residue (TDR)	No	No	No	No	No	No	No	No	No	No	
Total Dissolved Solids (TDS)	No	No	No	No	No	No	No	No	No	No	
Total Petroleum Hydrocarbons (TPH)	No	No	No	No	No	No	No	No	No	No	
Total Toxic Organics (TTO)	No	No	No	No	No	No	No	No	No	No	
Sulfide	No	No	No	No	No	No	No	Yes	No	No	
Iodine	No	No	No	No	No	No	No	Yes	No	No	
Surfactants	No	No	No	No	No	No	No	Yes	No	No	
Sodium	No	No	No	No	No	No	No	No	No	No	
Chloride	No	No	No	No	No	No	No	Yes	No	No	
Hydrogen sulfide	No	No	No	No	No	No	No	No	Yes	No	
Total Residual Chlorine (TRC)	No	No	No	No	No	No	No	No	No	No	
Ortho-Phosphorus	No	No	No	Report	No	No	No	No	No	No	
Organic Nitrogen	No	No	No	Report	No	No	No	No	No	No	
Nitrate-Nitrite as N	No	No	No	Report	No	No	No	No	No	No	
Kjeldahl Nitrogen, Total (TKN)	No	Yes	No	Report	No	No	No	No	No	No	YES

2.2.2 Calculation of Allowable Headworks Loadings

In this step, an AHL is calculated for each applicable criterion: WPCP design criteria, NPDES permit limits, state WQS, and the various forms of interference that can occur through the treatment processes. Equations for calculating AHLs are based on a concentration-based and mass-based approach. Equations are presented and described in Section 3. Once WPCP and POC-specific AHLs are calculated for each of the applicable criteria, the lowest, or most stringent, of the AHLs is chosen as the MAHL. This helps ensure that the resulting local limits are protective of each environmental criterion considered in the development of local limits.

2.2.3 Determination of Maximum Allowable Industrial Loadings and Local Limits

Once MAHLs are identified, they are used to calculate the MAILs and the concentration-based industrial local limits. The concentration-based industrial local limits are compared to screening levels protective of the WPCP workers, and the more stringent values are selected as the final local limits. Several methods are commonly used to allocate local limits to industrial users, including uniform industrial local limits, flow- or mass-based limits, and other limits developed on a case-by-case basis. Based on the needs of Fitzgerald Creek WPCP, CCWSA has chosen to implement concentration-based limits for each WPCP.

Section 3

Fitzgerald Creek: Local Limits Development

The primary objective of this section is to describe the methodologies used to develop local limits for Fitzgerald Creek WPCP. Included in this section are descriptions of AHL calculations based on various environmental criteria, including:

- Design criteria
- NPDES permits
- State acute and chronic WQS
- Activated sludge treatment inhibition
- Nitrification treatment inhibition
- Sludge disposal regulations.

Also included in this section are references to data sources used for calculating AHLs and the rationale for assumptions. Results of AHL calculations, determinations of the MAHLs, and calculations for MAILs and industrial local limits are also provided.

3.1 Introduction

The Fitzgerald Creek WPCP is located in the south part of the County at 260 Colemans Bluff Drive in Woodstock, Georgia (Figure 3-1). The receiving water of effluent from Fitzgerald Creek WPCP is the Little River to Lake Allatoona in the Coosa River Basin.

Figure 3-1. Aerial Photograph of the Fitzgerald Creek WPCP (April 2019)

3.1.1 NPDES Permit

The facility is authorized to initially discharge a monthly average of 5 mgd with future expansion to 11.75 mgd of advanced treated effluent to the Little River under NPDES Permit GA0038555 issued by EPD (refer to Appendix C, Table C2 for NPDES permit discharge limitations). This permit became effective as of June 1, 2015 and expires on May 31, 2020. The Little River, located in the Coosa River basin, is used for fishing and is the receiving water for effluent from the Fitzgerald Creek WPCP.

3.1.2 Treatment Processes

The Fitzgerald Creek WPCP was upgraded in 2008 and is a tertiary treatment facility which produces high quality effluent. The WPCP receives wastewater from the Little River Pumping Station and the Riverchase pumping station. For preliminary treatment, influent passes through fine screens that remove solids that are greater than ¼-inch and vortex grit removal. Equalization, or pre-aeration, of the preliminary effluent is provided in two concrete tanks equipped with jet aeration.

The secondary process at the Fitzgerald Creek WPCP consists of activated sludge using four SBR reactors operated in parallel. The SBR process is a modification of a conventional activated sludge plant. The WPCP has the capability to operate as either an SBR process or ICEAS process. If the SBR mode is selected, the influent valves will alternate positions to allow the inflow of wastewater into one to two of the basins at the time. If the ICEAS mode is selected, the influent valves will always remain open to allow continuous inflow at all times in the cycle. Effluent valves are open during the decant phase only in both the SBR and ICEAS mode. Screened and de-gritted wastewater enters the SBR during the fill period, is then aerated, and subsequently allowed to settle before the secondary effluent (supernatant) is decanted. After biological treatment, effluent from the SBRs flows to one of two equalization basins before flowing by gravity to the downstream tertiary treatment processes. The flow is regulated by a motorized control valve.

Secondary effluent from the SBRs flows from the effluent equalization basin to a set of rapid mix tanks, flocculation tanks, tertiary clarifiers, and filters. Polyaluminum chloride is added to the rapid mix tanks to promote chemical phosphorus removal. Effluent from the tertiary clarifiers flows to the continuous backwash filters for final polishing of the effluent before being directed to ultraviolet disinfection channels for disinfection. Cascade aeration is used to meet dissolved oxygen requirements for discharge to the Little River which flows to Lake Allatoona in the Coosa River Basin. Un-thickened waste activated sludge from the SBRs and sludge from tertiary treatment is pumped to aerobic digesters for sludge stabilization and thickening before final disposal.

3.2 Site-Specific Flows and Removal Efficiencies

Average flow rates and plant removal efficiencies are used to calculate AHLs for all criteria. Influent, effluent, and sludge flows for the Fitzgerald Creek WPCP are summarized in Appendix A, Table A1. Currently, the monthly average flow and permitted flow for the Fitzgerald Creek WPCP is 4.22 mgd and 5 mgd, respectively; however, an average effluent flow of 11.75 mgd and permitted flow of 11.75 mgd was used for the calculations to anticipate growth.

Influent and effluent concentrations of conventional pollutants from Fitzgerald Creek WPCP, including ammonia, biochemical oxygen demand (BOD), total phosphorus, Total Kjeldahl Nitrogen (TKN), and TSS, from November 2017 through October 2018 are summarized in Appendix A, Table A2. For non-conventional pollutants, two priority pollutant influent and effluent data sets were averaged between August 2017 and July 2018 for use in this evaluation from Fitzgerald Creek WPCP, and detections are presented in Appendix A, Tables A3 and A4. Site-specific removal efficiencies, R_{WPCP}, were calculated for the following POCs using average influent and effluent pollutant concentrations (Appendix A, Tables A2

through A4). Since only two data packages were provided for non-conventional pollutants, literature values were used in cases of negative percent removals.

- **Ammonia**: A plant removal efficiency of 99.62 percent was calculated using average influent and effluent concentrations of 38.7 mg/L and 0.1 mg/L, respectively.
- **BOD**: A plant removal efficiency of 99.01 percent was calculated using average influent and effluent concentrations of 281 mg/L and 2.8 mg/L, respectively.
- **Phosphorus, total**: A plant removal efficiency of 98.14 percent was calculated using average influent and effluent concentrations of 8.56 mg/L and 0.16 mg/L, respectively.
- **TKN**: A plant removal efficiency of 98.21 percent was calculated using average influent and effluent concentrations of 48 mg/L and 0.9 mg/L, respectively.
- **TSS**: A plant removal efficiency of 99.33 percent was calculated using average influent and effluent concentrations of 301 mg/L and 2.0 mg/L, respectively.
- **Arsenic**: A plant removal efficiency of 2.86 percent was calculated using an influent concentration of 0.0018 mg/L and an average effluent concentration of 0.0017 mg/L.
- **Chromium**: A plant removal efficiency of 32.9 percent was calculated using an influent concentration of 0.00205 mg/L and an average effluent concentration of 0.0014 mg/L.
- **Copper**: A plant removal efficiency of 94.5 percent was calculated using an influent concentration of 0.02720 mg/L and an average effluent concentration of 0.0015 mg/L.
- **Lead**: A plant removal efficiency of 74.52 percent was calculated using an influent concentration of 0.00105 mg/L and an average effluent concentration of 0.00027 mg/L.
- **Nickel:** A plant removal efficiency of 18.37 percent was calculated using an influent concentration of 0.0025 mg/L and an average effluent concentration of 0.0020 mg/L.
- **Zinc**: A plant removal efficiency of 79.03 percent was calculated using an influent concentration of 0.1385 mg/L and an average effluent concentration of 0.0291 mg/L.
- **Organics**: Plant removal efficiencies were calculated for chloroform (53.6 percent), benzo(a)anthracene (87.8 percent), chrysene (87.1 percent), phenol (92.7 percent), toluene (45.2 percent), and bis(2-ethylhexyl)phthalate (88.9 percent).

Sufficient data above reporting limits were not available for other POCs for plant removal efficiency calculations; therefore, literature values from EPA's Local Limits Development Guidance Manual (EPA 2004) were used. These values are provided in Appendix B, Tables B1 through B4.

3.3 Calculation of AHLs Based on NPDES Permit

An effective means of restricting the discharge of pollutants into receiving waters is through a NPDES permit limit. NPDES is the permitting system established by the Clean Water Act that regulates the discharge of pollutants into the waters of the United States. Such discharges are prohibited unless a NPDES permit is issued by EPA or the state. NPDES permit limits applied to discharges from WPCPs are used in the derivation of local limits to prevent pollutant pass-through. Pass-through is defined as a discharge that enters the waters of the United States from a WPCP in quantities or concentrations, alone or in complex mixtures, that cause a violation of any requirement of the WPCP's NPDES permit.

The NPDES permit limit for each POC, if applicable, can be found in the WPCP's current NPDES permit and is commonly expressed in mg/L and/or kilograms per day (kg/d). The Fitzgerald Creek WPCP's NPDES permit includes limitations for discharging effluent from the WPCP into the receiving stream. Therefore, AHLs are calculated based on the NPDES permit limits for discharge, as described further below.

3.3.1 Calculation of AHLs Based on Effluent Discharge

Fitzgerald Creek's NPDES permit for effluent discharge includes monthly average and weekly average discharge limitations for flow, BOD, TSS, ammonia, total phosphorus, fecal coliform bacteria, a minimum and maximum for pH, and a daily minimum for dissolved oxygen (DO). The permit also includes reporting requirements for ortho-phosphate, organic nitrogen, nitrate-nitrite, TKN, chronic whole effluent toxicity, long term biological demand, whole effluent toxicity test, priority pollutants, and temperature. EPA recommends that only the more conservative monthly average concentrations be used in calculating NPDES-based AHLs.

As illustrated in Equation 3-1, an AHL based on a NPDES permit limit (AHL_{NPDES}) is the pollutant loading at the NPDES permitted flow (C_{NPDES} * Q_{NPDES}) divided by the fraction of the pollutant not removed by the plant (1 – R_{WPCP}).

Equation 3-1

$$AHL_{NPDES} = \frac{(8.34)(C_{NPDES})(Q_{NPDES})}{(1-R_{WPCP})}$$

Where:

$$R_{WPCP} = \frac{\bar{I}_r - \bar{E}_{WPCP}}{\bar{I}_r}$$

and:

AHL_{NPDES}	= AHL based on NPDES permit limit, lb/d
C_{NPDES}	= NPDES permit limit for effluent discharge, mg/L
Q_{NPDES}	= NPDES permitted flow rate for effluent discharge, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
I_r	= WPCP influent pollutant concentration at headworks, mg/L
E_{WPCP}	= WPCP effluent pollutant concentration, mg/L
8.34	= Conversion factor, lb/gal

3.3.1.1 Data Sources and Assumptions

Calculations were performed based on the following components.

3.3.1.1.1 Flow Rates

Fitzgerald Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 11.75 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.3.1.1.2 Permit Limits

NPDES monthly average permit limits for POCs, C_{NPDES}, are 4.0 mg/L BOD, 20.0 mg/L TSS, 1.1 mg/L ammonia, 0.14 mg/L total phosphorus, and 200 #/100mL fecal coliform bacteria (Appendix C, Table C2).

3.3.1.1.3 Plant Removal Efficiencies

Site-specific removal efficiencies, R_{WPCP}, described in Section 3.2 were used in this calculation where possible. When site-specific removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.3.1.2 Calculation Results

The data used and calculation results for the AHLs based on NPDES permit limits at the Fitzgerald Creek WPCP are provided in Appendix C, Table C2. AHLs based on NPDES permits were calculated only for those pollutants with established permit limits and sufficient data to support the calculations. A summary of AHLs based on NPDES permit limits is provided in Appendix D, Table D3.

3.4 Calculation of AHLs Based on Water Quality Standards

Acute and chronic WQS established by EPD were used to calculate AHLs for the protection of the receiving stream. As illustrated in Equation 3-2, AHLs based on state WQS (AHL_{WQS}) are calculated as the pollutant loading to the water body at the water quality limit [C_{WQS} (Q_{STR} + Q_{WPCP})], adjusted for the background loading of the water body (C_{STR} * Q_{STR}), and divided by the fraction of the pollutant not removed by the plant (1 - R_{WPCP}).

Equation 3-2

$$AHL_{WQS} = \frac{(8.34)[C_{WQS}(Q_{STR}+Q_{WPCP})-(C_{STR}*Q_{STR})]}{(1-R_{WPCP})}$$

Where:

AHL_{WQS}	= AHL based on state WQS, lb/d
C_{STR}	= Receiving stream background concentration, mg/L
C_{WQS}	= In-stream state WQS, mg/L
Q_{STR}	= Receiving stream (upstream) flow rate, mgd
Q_{WPCP}	= WPCP average flow rate, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
8.34	= Conversion factor, lb/gal

3.4.1 Data Sources and Assumptions

AHLs based on WQS were calculated using Equation 3-2. The following data sources and assumptions were used.

3.4.1.1 Receiving Stream Flow Rates

For the AHLs based on acute WQS, Q_{STR} is the "1Q10" of the receiving stream, which is the lowest average flow for a 1-day period that is expected to occur once every 10 years. For the AHLs based on chronic WQS, Q_{STR} is the "7Q10" of the receiving stream, which is the lowest average flow for a 7-day period that is expected to occur once every 10 years. The 1Q10 and 7Q10 for the Little River were provided by the USGS Station 02392500. The 1Q10 and 7Q10 for the Little River are 4.66 cubic feet per second (cfs) or 3.00 mgd, and 5.45 cfs or 3.51 mgd, respectively (Appendix D, Table D1).

3.4.1.2 Water Quality Standards

The water use classification for the Little River is fishing. Therefore, several sets of WQS are applicable to the stream per *Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6* (DNR 2015), including the following:

- In-stream acute criteria for toxic priority pollutants, as provided in Chapter 391-3-6-.03(5)(ii)
- In-stream criteria for EPA toxic priority pollutants, as provided in Chapter 391-3-6-.03(5)(i), 391-3-6-.03(5)(ii), 391-3-6-.03(5)(iii), and/or 391-3-6-.03(5)(iv).

3.4.1.2.1 Metals

WQS for metals are reported for the dissolved fraction of the metal. Most metals measurements, however, are reported in the total or total recoverable form. Total and total recoverable metals concentrations are always at least as high as dissolved metals concentrations because a fraction of the metal may be adsorbed onto particulates in the water. Therefore, EPA recommends that WPCPs convert dissolved metals WQS into the total metals form before using the standards to calculate water quality-based AHLs. Metals are also often hardness-dependent. The standards must be adjusted according to the hardness of the receiving stream (upstream, in mg/L as calcium carbonate [$CaCO_3$]). The background hardness of the Little River is 25 mg/L. Equations 3-3 through 3-22, listed in Table 3-1 below, were used to calculate total recoverable acute and chronic WQS adjusted for stream hardness.

Table 3-1. Recoverable Acute and Chronic WQS for Metals

Metal	Equation No.	Equation
Arsenic	3-3	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 1.0
	3-4	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 1.0
Cadmium	3-5	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.0166(ln(hardness))-3.924} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = (1.136672 - [(ln($hardness$) (0.041838)])
	3-6	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.7409(ln(hardness))-4.719} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = (1.101672 - [(ln($hardness$) (0.041838)])
Chromium (III)	3-7	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.819(ln(hardness))+3.7256} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.316
	3-8	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.819(ln(hardness))+0.6848} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.86
Chromium (VI)	3-9	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.982
	3-10	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.962
Copper	3-11	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.9422(ln(hardness))-1.700} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.960
	3-12	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8545(ln(hardness))-1.702} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.960
Lead	3-13	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.273(ln(hardness))-1.460} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = (1.46203 - [(ln($hardness$) (0.145712)])
	3-14	Chronic WQS DISSOLVED (mg/L) = $e^{1.273(ln(hardness))-4.705} * CF/1000$ Chronic WQS TOTAL (mg/L) = Chronic WQS DISSOLVED / CF Where CF = (1.46203 - [(ln(hardness) (0.145712)])

Table 3-1. Recoverable Acute and Chronic WQS for Metals		
Metal	**Equation No.**	**Equation**
Mercury	3-15	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.85
	3-16	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.85
Nickel	3-17	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(\text{Hardness}))+2.255} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.998
	3-18	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(\text{Hardness}))+0.0584} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.997
Silver	3-19	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.72(ln(\text{Hardness}))-6.59} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.85
	3-20	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not available
Zinc	3-21	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8473(ln(\text{Hardness}))+0.884} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.978
	3-22	Chronic WQS$_{TOTAL}$ (mg/L) = $e^{0.8473(ln(\text{Hardness}))+0.884} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.986

3.4.1.3 Upstream Background Concentrations

Upstream water quality data was provided by CCWSA since the data from the United States Geological Survey (USGS) monitoring station 02392500 was outdated. Water quality data from Little River above the Fitzgerald Creek WPCP was used to obtain upstream background concentrations (C_{STR}) for several POCs. The data was from 2012 to 2018. Where data were not available, upstream concentrations were assumed to be negligible. These data are provided in Appendix A, Table A5.

3.4.1.4 Flow Rates

Fitzgerald Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 11.75 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Plant removal efficiencies were applied as described in Section 3.3.1.1.

3.4.2 Calculation Results

The calculations for total recoverable metals standards adjusted for stream hardness are provided in Appendix C, Table C4. The final state WQS for POCs are listed in Appendix C, Table C5. The data and calculation results for the AHLs to ensure compliance with the state and/or federal WQS at the WPCP are provided in Appendix D, Tables D7 and D8. AHLs based on WQS were calculated only for those pollutants with established standards or criteria. A summary of AHLs based on WQS is provided in Appendix D, Table D9.

3.5 Calculation of AHLs Based on Treatment Inhibition

Inhibition-based AHLs were calculated to protect against operational problems for biological treatment processes during secondary and/or tertiary treatment. This inhibition can interfere with a WPCP's ability to remove pollutants, including BOD. EPA does not require WPCPs to calculate AHLs based on inhibition threshold levels if current loadings are acceptable to the treatment processes. For WPCP, AHLs were calculated to prevent future loadings that may cause inhibition. Although site-specific inhibition data are preferred, literature data are available for use in developing AHLs when there are no current inhibition problems.

3.5.1 Activated Sludge Treatment Inhibition

As illustrated in Equation 3-23, the AHL based on inhibition of activated sludge treatment (AHL_{SEC1}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB2} * Q_{WPCP}) by the fraction of the pollutant not removed after primary treatment (1 - R_{PRIM}).

Equation 3-23

$$AHL_{SEC} = \frac{(8.34)(C_{INHIB2})(Q_{WPCP})}{(1-R_{PRIM})}$$

Where:

AHL_{SEC}	= AHL based on inhibition of activated sludge treatment, lb/d
C_{INHIB2}	= Inhibition criterion for activated sludge treatment, mg/L
Q_{WPCP}	= WPCP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.1.1 Data Sources and Assumptions

AHLs based on activated sludge treatment inhibition were calculated using Equation 3-23. The following data sources and assumptions were used.

Activated Sludge Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WPCPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB2}, are provided in Appendix B, Table B5. Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Fitzgerald Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 11.75 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Primary Removal Efficiencies. Primary treatment at the Fitzgerald Creek WPCP occurs through a packaged screening structure and secondary treatment occurs through SBRs. Site-specific activated sludge removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.5.1.2 Calculation Results

The data and calculation results for the AHLs to protect against activated sludge treatment inhibition at the WPCP are provided in Appendix D, Table D4. A summary of AHLs based on activated sludge treatment inhibition is provided in Appendix D, Table D9.

3.5.2 Nitrification Treatment Inhibition

As illustrated in Equation 3-24, the AHL based on inhibition of nitrification treatment (AHL_{TER}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB3} * Q_{WPCP}) by the fraction of the pollutant not removed after secondary treatment (1 - R_{PRIM}).

Equation 3-24

$$AHL_{TER} = \frac{(8.34)(C_{INHIB3})(Q_{WPCP})}{(1-R_{SEC})}$$

Where:

AHL_{TER}	= AHL based on inhibition of nitrification treatment, lb/d
C_{INHIB3}	= Inhibition criterion for nitrification treatment, mg/L
Q_{WPCP}	= WPCP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.2.1 Data Sources and Assumptions

AHLs based on nitrification treatment inhibition were calculated using Equation 3-24. The following data sources and assumptions were used.

Nitrification Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WPCPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB3}, are provided in Appendix B, Table B5. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Fitzgerald Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 11.75 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Secondary Removal Efficiencies. Site-specific removal efficiencies through secondary treatment were not available. Therefore, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. The medians of reported values were used in Equation 3-24 (Appendix B, Table B3).

3.5.2.2 Calculation Results

The data and calculation results for the AHLs to protect against nitrification treatment inhibition at the WPCP are provided in Appendix D, Table D5. A summary of AHLs based on nitrification treatment inhibition is provided in Appendix D, Table D9.

3.6 Calculation of AHLs Based on Sludge Disposal Regulations

Sludge disposal-based AHLs can be calculated for sludge depending on its end use. For example, sludge may be applied to land to condition the soil or fertilize crops, disposed of in a landfill, or incinerated. As stated earlier, sludge from WPCP is currently land applied. WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements (40 CFR 503.13). These federal sludge regulations establish limitations for nine common metals that are controlled primarily by the Pretreatment Program. For all land application of biosolids, WPCPs must comply with the ceiling concentrations of Table 1 in 40 CFR 503. In addition, for biosolids that are applied to agricultural land, a WPCP must also comply with either the cumulative loading rates of Table 2 or the monthly average pollutant concentrations in Table 3 in 40 CFR 503. The criterion used in calculations was the more

stringent between the ceiling concentrations, cumulative pollutant loading rates, monthly average pollutant concentrations and landfill disposal – TCLP regulatory levels.

As illustrated in Equation 3-25, the AHL based on sludge regulations (AHL_{SLDG}) is calculated by dividing the pollutant loading of sludge at the sludge standard ($C_{SLDGSTD}$ * Q_{SLDG}) by the overall plant removal efficiency (R_{WPCP}).

Equation 3-25 $$AHL_{SLDG} = \frac{(C_{SLDGSTD})(Q_{SLDG})(0.0022)}{(R_{WPCP})}$$

Where:

AHL_{SLDG}	= AHL based on sludge regulations, lb/d
$C_{SLDGSTD}$	= Most stringent sludge standard, mg/kg-dry
Q_{SLDG}	= Total sludge flow to disposal, dry metric tons/d
R_{WPCP}	= Removal efficiency from headworks to final effluent, decimal
0.0022	= Conversion factor

3.6.1 Data Sources and Assumptions

AHLs based on sludge regulations were calculated using Equation 3-25. The sludge standard used in the equation, $C_{SLDGSTD}$, is the most stringent criteria listed in Tables 1 through 3 of 40 CFR 503 (Appendix C, Table C3. Sludge flow to disposal (Q_{SLDG}) is equal to the average flow of dry sludge to disposal of 247,774 pounds per day (lb/d) (411,305 lb/d increased by 66 percent due to local limits being calculated on full build out) based on data from Fitzgerald Creek WPCP (Appendix A, Table A1).

Plant removal efficiencies were applied as discussed in Section 3.3.1.1.

For trivalent and hexavalent chromium, the total chromium standard of 100 mg/kg was used to calculate the sludge disposal AHLs.

3.6.2 Calculation Results

The data and calculation results for the AHLs based on sludge disposal regulations for the WPCP are provided in Appendix D, Table D6. A summary of AHLs based on sludge disposal regulations is provided in Appendix D, Table D9.

3.7 Calculation of AHLs Based on Design Criteria

Some pollutants such as ammonia, BOD, total phosphorus, and TSS require additional evaluation before MAHLs are established because WPCPs are typically designed to treat these pollutants. EPA recommends that WPCPs develop AHLs based on design criteria when the WPCP begins to operate at 80 to 90 percent of its design capacity for 3 to 6 consecutive months. In addition, if the rate of increase in pollutant loadings suggests that the full capacity of the WPCP will be used within 5 to 7 years, then planning to avoid future violations should begin immediately.

As illustrated in Equation 3-26, the AHL based on design criteria (AHL_{DESIGN}) is calculated by multiplying the design criteria (mg/L) by the WPCP permitted flow (mgd).

Equation 3-26 $$AHL_{DESIGN} = 8.34 \times DC \times Q_{NPDES}$$

Where:

AHL_{DESIGN}	= AHL based on design criteria, lb/d
DC	= Design criteria, mg/L
Q_{NPDES}	= WPCP permitted flow rate, mgd
8.34	= Conversion factor, lb/gal

3.7.1 Data Sources and Assumptions

AHLs based on design criteria were calculated using Equation 3-26. The following data sources and assumptions were used.

3.7.1.1 Design Criteria

Fitzgerald Creek WPCP was designed to treat maximum day BOD, TSS, COD, TKN, ammonia and total phosphorus influent concentrations of 448 mg/L, 431, mg/L, 950 mg/L, 106.0 mg/L, 76.0 mg/L, and 16 mg/L, respectively. The influent design criteria are from the September 2011 Fitzgerald Creek WWTP and Rose Creek WWTP Capacity Assessment (Table C1) and are provided in Appendix D, Table D2.

Flow Rate. Fitzgerald Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 11.75 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.7.2 Calculation Results

The data and calculation results for the AHLs based on design criteria for the Fitzgerald Creek WPCP are provided in Appendix D, Table D2. A summary of AHLs is provided in Appendix D, Table D9.

3.8 Special Cases

The following sections describe the methods for developing local limits for other parameters.

3.8.1 Fats, Oils, and Greases

Fats, oils, and greases (FOG) includes materials of vegetable, animal, and mineral origin. The pretreatment regulations in 40 CFR 403.5(b)(6) prohibit the discharge of "petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through." If treatment inhibition is occurring, WPCPs could calculate FOG removal efficiencies, determine FOG inhibition criteria, and determine AHLs based on inhibition.

According to EPA, most WPCPs have adopted a 100 mg/L limit for FOG of animal or vegetable origin as determined by an approved analytical procedure for oil and grease analysis. CCWSA has historically used 100 mg/L as the local limit for oil and grease and has found this limit to be effective for the treatment plant capacity; therefore, CCWSA will continue to use this limit in this LLE.

3.9 Maximum Allowable Headworks Loadings

Appendix D, Table D9 provides a summary of the AHLs calculated to ensure compliance with each of the environmental criteria: design criteria, NPDES permit limits, activated sludge treatment inhibition, nitrification treatment inhibition, sludge disposal, and WQS. Appendix D, Table D11 identifies the most stringent AHL for each POC, referred to as the MAHL. This loading is the maximum loading the WPCP can accept at the headworks, and it is used to calculate the MAILs and local limits.

EPA recommends that local limits are needed when the current average influent loading of a toxic pollutant exceeds 60 percent of the MAHL or when the maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time during the 12-month period preceding the analysis. Equation 3-27 compares WPCP loadings based on permitted flow to the calculated MAHLs for individual POCs and can be used to calculate the percentage of the MAHL currently being received at the WPCP. The average influent loading was used in this equation for all POCs.

Equation 3-27 $$L_{\%} = \frac{L_{INFL}}{MAHL} * 100$$

Where: $$L_{INFL} = 8.34 \times Q_{WPCP} \times PL$$

and:

$L_{\%}$	=	Percentage of MAHL currently utilized, percent
L_{INFL}	=	Current influent loading (average or daily maximum), lb/d
MAHL	=	Calculated MAHL, lb/d
Q_{WPCP}	=	WPCP average flow rate, mgd
PL	=	Average influent pollutant loading, lb/d
8.34	=	Conversion factor, lb/gal

3.9.1 Data Sources and Assumptions

Average influent and effluent concentrations of conventional pollutants were available for November 2017 through October 2018 (Appendix A, Table A2). Using the average flow rate at the Fitzgerald Creek WPCP of 11.75 mgd and the conversion factor 8.34, the average influent concentrations were converted to average influent loadings for use in Equation 3-27.

3.9.2 Calculation Results

Calculated percentages of MAHLs currently received at the Fitzgerald Creek WPCP are provided in Appendix D, Table D11. For those that have been detected, conventional POCs are below 60 percent of the MAHL.

CCWSA has not eliminated any POCs from the evaluation based on current utilizations. Therefore, all POCs included in Table 2-1 were retained for the remainder of the LLE.

3.10 Maximum Allowable Industrial Loadings and Local Limits

The MAIL is the estimated maximum loading of a pollutant that can be received at a WPCP's headworks from all permitted industrial users and other controlled sources without causing pass-through or interference. As shown in Equation 3-28, the MAIL is calculated by subtracting estimates of loadings from uncontrolled sources (L_{UNC}), including septic/hauled waste, from a MAHL adjusted with a safety and growth factor (SGF).

Equation 3-28 $$MAIL = MAHL(1 - SGF) - (L_{UNC})$$

Where: $$L_{UNC} = (C_{DOM} \times Q_{DOM} \times 8.34) + (C_{HW} \times Q_{HW} \times 8.34)$$

and:

MAIL	=	Maximum allowable industrial loading, lb/d
MAHL	=	Maximum allowable headworks loading, lb/d
L_{UNC}	=	Loadings from uncontrolled sources, lb/d (uncontrolled sources = domestic/commercial + septic/hauled waste)
SGF	=	Safety and growth factor, decimal, if desired
C_{DOM}	=	Domestic and commercial background levels, mg/L
Q_{DOM}	=	Domestic and commercial flow, mgd
C_{HW}	=	Septic/hauled waste levels, mg/L
Q_{HW}	=	Septic/hauled flow, mgd
8.34	=	Conversion factor, lb/gal

A WPCP can then use several basic approaches to assign limits to its controlled or permitted dischargers, including limits based on industrial user contributions of a pollutant, uniform limits for all controlled dischargers, as needed case-by-case, or creative allocation methods. These approaches can vary between WPCPs and pollutants. For this LLE, the concentration-based limits methods, described in

EPA's *Local Limits Development Guidance Manual* (EPA 2004), were used to calculate local limits. As illustrated in Equation 3-29, this method of allocating MAILs for conservative pollutants yields one concentration-based limit per pollutant (C_{LIM}) that applies to every controlled discharger. In this equation, the calculated MAIL for each pollutant is divided by the total industrial flow rate, Q_{IND}.

Equation 3-29 $$C_{LIM} = \frac{MAIL}{(Q_{IND})(8.34)}$$

Where: $$Q_{IND} = Q_{WWTP} - Q_{DOM} - Q_{HW}$$

and:

C_{LIM}	=	Concentration-based local limit, mg/L
MAIL	=	Maximum allowable industrial loading, lb/d
Q_{IND}	=	Total flow rate from industrial sources, mgd
Q_{DOM}	=	Total flow rate from domestic/commercial sources, mgd
Q_{HW}	=	Total flow rate from septic/hauled waste, mgd
Q_{WPCP}	=	WPCP average flow rate, mgd
8.34	=	Conversion factor, lb/gal

3.10.1 Data Sources and Assumptions

Flow Rates. Average flow from domestic and commercial sources (Q_{DOM}) is 10.58 mgd and was calculated by subtracting total industrial flow (Q_{IND}) and septic/hauled waste flow (Q_{HW}) from the Fitzgerald Creek WPCP average influent flow rate (Q_{WPCP}) of 11.75 mgd (Appendix A, Table A1). The total industrial flow, Q_{IND}, of 1.175 mgd is 10 percent of the total flow estimated by the CCWSA, and the septic/hauled waste, Q_{HW}, receiving at WPCP is estimated from Fitzgerald Creek WPCP at 0 mgd due to no flow.

Domestic and Commercial Wastewater Background Concentrations. When site-specific domestic/commercial background concentrations of POCs in wastewater were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used for domestic and commercial background levels (C_{DOM}) of POCs in wastewater (Appendix B, Table B7).

In cases where C_{DOM} values were not available, and for those pollutants not detected in the plant's influent, C_{DOM} was assumed to be negligible.

Safety and Growth Factor. A safety and growth factor is site-specific and depends on local conditions, and incorporates both a safety factor and a growth factor. The main purpose of a safety factor is to address data "uncertainties" that can affect the ability of the WPCP to calculate accurate local limits. At a minimum, EPA recommends a 10 percent safety factor. Safety factors can vary between POCs and should depend on the variability of the WPCP's data, amount of data the WPCP used to develop its MAHLs, quality of the WPCP's data, amount of literature data used, history of compliance with the parameter, and potential for industrial user slug loadings (for example, because of a chemical spill or flood event). In addition to the safety factor, a growth factor can be incorporated to account for anticipated growth in the county from present until the local limits will be reevaluated.

A safety factor of 10 percent was used in the evaluation. No additional growth factor was used.

3.10.2 Calculation Results

Appendix D, Tables D2 through D8 provide the results of converting commercial/domestic background levels and septic/hauled waste concentrations to pollutant loadings from these sources and calculates the AILs. A summary of AILs is provided in Appendix D, Table D10, and the MAILs are identified in Appendix D, Table D11. In some cases, the total domestic/commercial loadings for a POC approached or

exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. In the case of negative MAILs, the domestic/commercial background concentrations were used as the industrial local limits. The calculated MAILs were then used to calculate industrial local limits, which are also summarized in Appendix D Table D11.

3.10.3 Worker Safety and Protection

The safety and protection of the WPCP workers are also considered in a local limits evaluation. In 1990, EPA issued guidance for reactive and gas/vapor-toxic discharges to WPCPs for the purpose of protecting WPCP workers. This guidance requires WPCPs to identify and control potential exposures to substances in industrial wastewaters that are reactive or that create toxic gases and vapors.

3.10.3.1 Data Sources and Assumptions

Worker Protection Screening Levels for fume toxicity and for explosivity are available in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Similar screening levels are found in EPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 1992). These values are provided in Appendix C Tables C6 and C7. For the two organic POCs evaluated, Worker Protection Screening Level was not applied.

3.10.4 Domestic and Commercial Background Concentrations

In some cases, the total domestic and commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. This situation may arise in part because some of the facilities considered "uncontrollable" are commercial facilities such as gas stations, radiator repair shops, car washes, or hospitals, which may discharge high levels of pollutants. The WPCP may need to evaluate the sources it considers uncontrollable to see if some of them would be better classified as controlled sources with reducible pollutant loadings. There were no negative MAIL or local limits calculated in this evaluation.

3.10.4.1 Data Sources and Assumptions

The domestic and commercial background concentrations used in this screening are provided in Appendix B, Table B7, and are consistent with those described in Section 3.10.1.

3.10.5 Calculation Results

Refer to the four right-most columns in Appendix D Table D11 for results of screening the calculated local limits against Worker Protection Screening Levels and the domestic and commercial background levels.

3.11 Summary

The calculated and proposed local limits that apply to all non-domestic dischargers to the Fitzgerald Creek WPCP are discussed below. Based on this comprehensive evaluation, influent loadings below the proposed limits are not expected to cause interferences with treatment processes at the Fitzgerald Creek WPCP.

3.11.1 Conventional Pollutants

The following local limits were developed for conventional pollutants:

- **Ammonia:** The calculated local limit of 536 mg/L is based on the most stringent design criteria limit of 76 mg/L. Based on this criterion, the MAHL is 7,448 lb/d with a 21.7 percent current utilization. The local limit will be the design limit of 76 mg/L.

- **Biological oxygen demand:** The calculated local limit of 2,560 mg/L is based on the design criteria of 448 mg/L. Based on this criterion, the MAHL is 39,594 lb/d with a 29.6 percent current utilization. The local limit will be the design limit of 448 mg/L.
- **Chemical oxygen demand:** The calculated local limit of 6,267 mg/L is based on the design criteria of 950 mg/L. Based on this criterion, the MAHL is 93,072 lb/d with a 26.7 percent current utilization. The local limit will be the design limit of 950 mg/L.
- **Total phosphorus:** The calculated local limit of 35 mg/L is based on the design criteria of 16 mg/L. Based on this criterion, the MAHL is 738 lb/d with a 48.4 percent current utilization. The local limit will be the design limit of 16 mg/L.
- **Total suspended solids:** The calculated local limit of 2,724 mg/L is based on the design criteria of 431 mg/L. Based on this criterion, the MAHL is 42,236 lb/d with a 29.8 percent current utilization. The local limit will be the design limit of 431 mg/L.
- **Total Kjeldahl Nitrogen:** The calculated local limit of 954 mg/L is based on the design criteria of 106 mg/L. Based on this criterion, the MAHL is 10,387 lb/d with a 45.2 percent current utilization. The local limit will be the design limit of 106 mg/L.

Per the request of CCWSA, conventional pollutants were lowered to the design criteria values to be conservative and further protect the WPCP. If additional loading or changes to loadings are applied to the Fitzgerald Creek WPCP, a new LLE will need to be completed to assess if pollutant limits will need to be re-instated.

3.11.2 Inorganic Pollutants

For the current evaluation, EPD provided upstream background concentrations, including hardness, which was used to adjust metals that are hardness-dependent. The receiving stream's hardness was assumed at 25 mg/L.

- **Antimony:** The calculated local limit of 7.48 mg/L is based on the chronic water quality standard of 0.64 mg/L. Since there is currently no loading for molybdenum, no local limit is needed.
- **Arsenic:** The calculated local limit of 0.105 mg/L is based on the chronic water quality standard of 0.010 mg/L. The local limit is recommended for 0.105 mg/L.
- **Cadmium:** The calculated local limit for cadmium is 0.002 mg/L, based on the chronic water quality standard of 0.00010 mg/L. The local limit is recommended for 0.002 mg/L.
- **Total chromium:** Because hexavalent chromium is known to be the more toxic form of total chromium and there are now separate WQS for hexavalent and trivalent chromium, it is recommended to develop local limits for hexavalent and trivalent forms of chromium. A local limit for total chromium was still calculated at 11.4 based on sludge disposal.
- **Hexavalent chromium:** The calculated local limit for hexavalent chromium is 0.477 mg/L, based on the chronic water quality standard of 0.011 mg/L. The local limit is recommended for 0.477 mg/L.
- **Trivalent chromium:** The calculated local limit for trivalent chromium is 1.16 mg/L, based on the chronic water quality standard of 0.028 mg/L. The local limit is recommended for 1.16 mg/L.
- **Copper:** The calculated local limit of 0.362 mg/L is based on the chronic water quality standard of 0.0029 mg/L. The local limit will be set at 0.362 mg/L.
- **Cyanide:** The calculated local limit of 0.179 mg/L is based on the chronic water quality standard of 0.0052 mg/L. The local limit is recommended for 0.179 mg/L.
- **Lead:** The calculated local limit for lead is 0.016 mg/L, based on the chronic water quality standard of 0.005 mg/L. The local limit is recommended for 0.016 mg/L.

- **Mercury:** The calculated local limit for mercury is 0.0005 mg/L, based on the chronic water quality standard of 0.000014 mg/L. The local limit is recommended for 0.0005 mg/L.
- **Molybdenum:** The calculated local limit for molybdenum is 9.76 mg/L, based on sludge disposal regulations. Since there is currently no loading for molybdenum, no local limit is needed.
- **Nickel:** The calculated local limit for nickel is 0.208 mg/L based on the chronic water quality standard of 0.016 mg/L. The local limit is recommended for 0.208 mg/L.
- **Selenium:** The calculated local limit for selenium is 0.117 mg/L, based on the chronic water quality standard of 0.005 mg/L. The local limit is recommended for 0.117 mg/L.
- **Silver:** The calculated local limit for silver is 0.010 mg/L, based on the acute water quality standard of 0.00035 mg/L. The local limit is recommended for 0.010 mg/L.
- **Zinc:** The calculated local limit for zinc is 0.75 mg/L, based on the acute state water quality standard of 0.037 mg/L. The local limit is recommended for 0.75 mg/L.

3.11.3 Organic Pollutants

Based on the initial screening for POCs, three organic pollutants were added to the evaluation based on their detection in the plant's influent or effluent scans, or an industrial user's effluent, and if there is an applicable criterion on which to base a defensible local limit. MAHLs, MAILs, and local limits were calculated for these two parameters. The organics evaluation is included below:

- **Bis(2-ethylhexyl)phthalate:** The calculated local limit for Bis(2-ethylhexyl)phthalate of 0.178 mg/L is based on chronic state water quality standards. The local limit of 0.178 for bis(2-ethylhexyl)phthalate is recommended.
- **Chloroform:** The calculated local limit for chloroform of 8.43 mg/L is based on sludge disposal. The local limit of 8.43 for chloroform is recommended.
- **Phenol:** The calculated local limit for Phenol of 39.1 mg/L is based on nitrification treatment inhibition. Since there is no industrial loading of Phenol, no local limit is recommended at this time.

3.11.4 Other Pollutants

The following local limits were developed for other pollutants:

- **Fats, Oils, and Grease:** The local limit for FOG is 100 mg/L, based on EPA's guidance document, *Controlling Fats, Oils, and Grease Discharges from Food Service Establishments* (September 2012). Per EPA, local limits for FOG typically range between 50 and 450 mg/L, with 100 mg/L as the most commonly reported value.

Section 4

Industrial Allocations

This section describes the methodologies used to allocate the MAILs to the permitted industries.

4.1 Introduction

A WPCP has several options available for applying limits to its controllable sources, including permitted industries. Limits can be applied as concentration-based limits (typically in mg/L) or mass-based limits (typically in lb/day), or both. The type of limit is in part dependent on the type of method used by the WPCP to allocate the MAILs among the dischargers. There are several methods commonly used to allocate limits.

The uniform method of allocating MAILs is a very commonly used method that yields one limit per pollutant that applies to all IUs regardless of size, permitted flow, or discharge. This method is not always preferred, since some IUs that do not discharge the pollutant may be given an allocation of the MAIL that they may not need whereas other IUs that do discharge that same pollutant may have to pretreat to comply with the uniform local limit.

Two additional methods of allocating MAILs among IUs are flow-based or mass-based limits. Flow-based limits are based on the permitted flows of each IU, whereas the mass-based limits are based on the proportion of the discharger's loadings to the total influent loadings at the WPCP.

Finally, a WPCP may set limits specific to each IU on a case-by-case basis. This type of allocation allows the WPCP personnel to use their knowledge of each IU discharge in conjunction with their own judgment in setting limits. This method can be used in conjunction with either flow-based or mass-based limits.

4.2 Allocations of MAILs

For this evaluation, industrial limits were allocated to the IU's using a combination of flow basis and case-by-case basis. Once the MAIL for each pollutant was calculated, it was distributed between current and future potential industries. For the purpose of this evaluation, 10 percent of the MAILs were allocated to future potential industries. This serves as an added safety factor and allows for some industrial growth.

Equation 5.1 was used to calculate flow-based allocations of the MAILs.

Equation 5.1 $$ALLOC_{PP} = (MAIL) - (L_{FUTURE})$$

Where: $$L_{FUTURE} = (MAIL) \times (F_{FUTURE})$$

and:

$ALLOC_{PP}$	= Portion of the MAIL allocated to Pilgrim's Pride, lb/day
MAIL	= Maximum allowable industrial loading, lb/day
L_{FUTURE}	= Amount of loading allocated to future potential industries, lb/day
F_{FUTURE}	= Fraction of MAIL to be allocated to future potential industries, decimal

4.2.1 Data Sources and Assumptions

The permitted flow was based on 10 percent of the total flow of the Fitzgerald Creek WPCP to anticipate future growth. The permitted flow used for calculations was 1.175 mgd.

Average effluent concentrations of conventional pollutants and priority pollutants from IU's are provided upon request. Current IU discharging to the Fitzgerald Creek WPCP is Pilgrim's Pride.

4.2.2 Calculation Results

The data and calculation results for the allocations of industrial loadings to IU's are provided in Appendix D. The allocated loadings to current and future potential industries at Fitzgerald Creek WPCP are summarized in Section 5.

4.3 Summary

Concentration-based permit limits were developed for IU's for discharge to Fitzgerald Creek WPCP. The permit limits for the Fitzgerald Creek WPCP are summarized in Section 5. For the chromium local limit, CCWSA may either elect to set industrial permit limits for total chromium or for the speciated form (trivalent and hexavalent chromium).

Section 5

Final Proposed Local Limits

Table 5-1 provides a summary of the calculated concentration-based local limits for the Fitzgerald Creek WPCP. The final proposed local limits are as follows:

Table 5-1. Summary of Local Limits for Fitzgerald Creek WPCP

	Calculated Local Limits (mg/l)	Technical basis
Conventional pollutants		
Ammonia (as N)	76	Design criteria
Biochemical Oxygen Demand (BOD)	448	Design criteria
Chemical Oxygen Demand (COD)	950	Design criteria
Phosphorus, Total (as P)	16	Design criteria
Suspended Solids, Total (TSS)	431	Design criteria
Kjeldahl Nitrogen, Total (TKN)	106	Design criteria
Inorganic Pollutants		
Arsenic	0.105	Activated Sludge Treatment Inhibition
Cadmium	0.002	Chronic State WQS
Chromium III	1.16	Sludge Disposal
Chromium VI	0.477	Chronic State WQS
Chromium, Total	11.4	Sludge Disposal
Copper	0.362	Nitrification Treatment Inhibition
Cyanide	0.179	Chronic State WQS
Lead	0.016	Chronic State WQS
Mercury	0.0005	Chronic State WQS
Nickel	0.208	Chronic State WQS
Selenium	0.117	Sludge Disposal
Silver	0.010	Acute State WQS
Zinc	0.75	Nitrification Treatment Inhibition
Organic Pollutants		
Bis(2-ethylhexyl)Phthalate	0.178	Chronic State WQS
Chloroform	8.43	Sludge Disposal
Other Pollutants		
Oil and Grease	100	EPA Recommendation

Section 6

Limitations

This document was prepared solely for CCWSA in accordance with professional standards at the time the services were performed and in accordance with the Agreement for General Engineering Services between CCWSA and BC dated October 6, 2017 and the Notice to Proceed dated August 13, 2018. This document is governed by the specific scope of work authorized by CCWSA; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by CCWSA and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 7

References

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Appendix A: Fitzgerald Creek WPCP Data

Table A1. Flow Summary for Fitzgerald Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority						
Date	Influent Flow (mgd)		Effluent Flow (mgd)		Sludge to Landfill	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average (dry lb/day)	Monthly Average (dry tons/day)
Nov - 2017	4.12	4.69	4.72	5.38	260,298	130
Dec - 2017	3.07	4.87	4.64	5.45	228,471	114
Jan - 2018	4.16	4.92	4.27	5.16	237,869	119
Feb - 2018	4.36	6.19	4.41	5.89	220,314	196
Mar - 2018	4.15	5.20	4.15	5.13	253,868	127
Apr - 2018	4.01	6.11	3.99	5.97	255,216	128
May - 2018	4.13	4.99	4.29	5.22	243,411	122
Jun - 2018	3.94	5.02	4.00	5.03	269,894	188
Jul - 2018	3.79	4.43	3.81	4.57	273,516	137
Aug - 2018	4.16	5.01	4.18	5.00	264,878	132
Sep - 2018	3.71	4.37	3.82	4.69	219,511	110
Oct - 2018	4.05	5.56	4.38	5.48	246,041	123
Averages	3.97	5.11	4.22	5.25	247,774	136
Maximum	4.36	6.19	4.72	5.97	273,516	196
Minimum	3.07	4.37	3.81	4.57	219,511	110

Table A2. Influent and Effluent Summary for Conventional Pollutants for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Year	Influent BOD (mg/L)		Effluent BOD (mg/L)		Influent NH_3 (mg/L-N)		Effluent NH_3 (mg/L-N)		Influent Phosphorus (mg/L)		Effluent Phosphorus (mg/L)		Influent TKN[a] (mg/L)		Effluent TKN (mg/L)		Influent TSS (mg/L)		Effluent TSS (mg/L)	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum
Nov-17	391	710	2.2	3.0	43	48	0.22	1.08	8.98	10.00	0.17	0.41	55	59	0.7	1.5	414	596	1.5	2.8
Dec-17	366	515	2.8	4.0	38	48	0.07	0.21	9.03	10.00	0.13	0.34	55	58	0.6	0.8	398	595	1.5	2.7
Jan-18	242	388	3.1	4.0	44	47	0.31	3.32	8.70	10.10	0.22	0.81	51	57	1.6	4.1	241	411	2.5	7.7
Feb-18	326	720	3.0	4.0	38	40	0.11	0.41	8.47	8.80	0.19	0.42	49	54	0.7	1.0	349	627	1.8	2.8
Mar-18	344	537	2.8	4.0	44	48	0.07	0.27	9.20	10.50	0.25	0.42	49	52	0.7	1.1	366	557	2.1	3.8
Apr-18	318	518	3.0	6.0	45	53	0.09	0.36	10.47	11.80	0.14	0.31	31	31	0.3	0.3	337	680	1.5	3.9
May-18	260	375	3.1	4.0	35	44	0.10	0.63	8.64	10.00	0.15	0.34	52	64	1.1	2.3	294	467	2.2	5.8
Jun-18	219	313	2.5	3.0	34	35	0.12	1.26	7.63	8.10	0.19	0.55	40	46	0.4	0.6	226	305	2.3	5.4
Jul-18	217	282	2.9	4.0	32	33	0.13	0.41	7.54	7.90	0.12	0.21	50	57	0.5	0.5	245	297	2.3	4.8
Aug-18	241	284	3.1	4.0	34	39	0.18	2.14	8.35	8.80	0.17	0.27	48	50	0.8	2.3	270	310	1.8	6.4
Sep-18	204	271	2.8	3.0	39	41	0.12	1.17	8.30	8.70	0.10	0.41	46	46	2.3	7.2	211	297	2.8	10.1
Oct-18	243	334	2.0	2.0	39	42	0.23	3.32	7.38	8.50	0.09	0.17	49	49	0.5	0.7	268	372	2.0	3.7
Average	281	437	2.8	3.8	38.7	43.2	0.1	1.22	8.56	9.43	0.16	0.39	48	52	0.9	1.88	301	460	2.0	4.99
Maximum	391	720	3.1	6.0	44.7	53.0	0.3	3.32	10.47	11.80	0.25	0.81	55	64	2.3	7.23	414	680	2.8	10.10
Minimum	204	271	2.0	2.0	32.0	33.0	0.1	0.21	7.38	7.90	0.09	0.17	31	31	0.3	0.34	211	297	1.5	2.70
Removal Efficiency (%)	99.01%				99.62%				98.14%				98.21%				99.33%			

[a]Influent TKN data are taken from the 2017 monthly data due to no information from May thru August 2018

Abbreviations:

mg/L - milligrams per liter.
BOD - Biochemical Oxygen Demand.
NH_3 - Ammonia.
TKN - Total Kjeldahl Nitrogen.
TSS - Total Suspended Solids.

Table A3. Influent and Effluent Summary for Inorganic Pollutants for Fitzgerald Creek WPCP[a]
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Year	Arsenic (mg/L)		Chromium (mg/L)		Copper (mg/L)		Lead (mg/L)		Nickel (mg/L)		Zinc (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
8/23/17 (FC-comp)	**0.0010**	**0.0009**	**0.0016**	*0.00025*	**0.0263**	**0.0005**	**0.00060**	*0.00004*	**0.0024**	**0.0015**	**0.1300**	**0.0225**
7/17/18 (FC-comp)	*0.0025*	*0.0025*	*0.0025*	*0.0025*	**0.0281**	*0.0025*	**0.00150**	*0.0005*	*0.0025*	*0.0025*	**0.1470**	**0.0356**
Average	0.0018	0.0017	0.00205	0.0014	0.02720	0.0015	0.00105	0.00027	0.0025	0.0020	0.1385	0.0291
Maximum	0.0025	0.0025	0.0025	0.0025	0.0281	0.0025	0.00150	0.00050	0.0025	0.0025	0.1470	0.0356
Minimum	0.0010	0.0009	0.0016	0.0003	0.0263	0.0005	0.0006	0.0000	0.0024	0.0015	0.1300	0.0225
Removal Efficiencies (%)	2.86%		32.9%		94.5%		74.52%		18.37%		79.03%	

[a]Influent and Effluent are taken from Fitzgerald Creek WPCP

Abbreviations:

mg/L - milligrams per liter.

Notes:

Values in italics were nondetect and are therefore represent half the reporting limit.

Table A4. Influent and Effluent Summary for Organics for Fitzgerald Creek WPCP[a]
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Year	Chloroform (mg/L)		Toluene (mg/L)		Bis(2-ethylhexyl)phthalate (mg/L)		Benzo(a)anthracene (mg/L)		Chrysene (mg/L)		Phenol (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
8/24/17 (FC-grab)	**0.0018**	*0.0003*	**0.0011**	*0.00015*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
8/23/17 (FC-comp)	*NS*	*NS*	*NS*	*NS*	*0.026*	**0.0007**	*0.021*	**0.0004**	*0.0205*	**0.0005**	**0.038**	*0.0005*
7/18/18 (FC-grab)	*0.001*	*0.001*	*0.001*	*0.001*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
7/17/18 (FC-comp)	*NS*	*NS*	*NS*	*NS*	*0.00245*	*0.00245*	*0.00245*	*0.00245*	*0.00245*	*0.00245*	*0.00245*	*0.00245*
Averages	0.0014	0.0007	0.0011	0.0006	0.0142	0.0016	0.0117	0.0014	0.0115	0.0015	0.0202	0.0015
Maximum	0.0018	0.0010	0.0011	0.0010	0.0260	0.0025	0.0210	0.0025	0.0205	0.0025	0.0380	0.0025
Minimum	0.0010	0.0003	0.0010	0.0002	0.0025	0.0007	0.0025	0.0004	0.0025	0.0005	0.0025	0.0005
Removal Efficiencies (%)	53.6%		45.2%		88.9%		87.8%		87.1%		92.7%	

[a]Influent and Effluent are taken from Fitzgerald Creek WPCP

Abbreviations:

mg/L - milligrams per liter.

NS- Not Sampled.

Notes:

Values in italics were nondetect and are therefore represent half the reporting limit.

Table A5. Upstream Background Concentration Summary for Fitzgerald Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority	
Monitoring Location Information	
Receiving Stream	Little River
Monitoring Location Id[a]	02392500
Monitoring Location Name[a]	Little River near Roswell, GA
Date Range	NA
Parameter[b]	Average Concentration (mg/L)
Conventional Pollutants	
Suspended Solids, Total (TSS)	12.38
Ammonia	0.03
Kjeldahl Nitrogen, Total (TKN)	*0.50*
Temperature (°C)	18.70
pH (SU)	7.16
Phosphorus, Total (as P)	0.06
DO (mg/L)	8.78
Flow (cfs)	59.23

[a]The USGS Monitoring station upstream of Fitzgerald Creek WPCP has flow current data only: Stream Data from CCWSA.

[b]Values in italics were nondetect and are therefore represent half the reporting limit.

Appendix B: Literature Data

Table B1. Treatment Plant Removal Efficiencies - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Pollutant	Median (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics		
Barium	73	1 of 47
Cadmium	28	7 of 47
Chromium	68	10 of 47
Copper	65	25 of 47
Cyanide	18	3 of 47
Lead	45	12 of 47
Nickel	34	10 of 47
Silver	41	4 of 47
Zinc	62	27 of 47
Organics		
1,2-trans-Dichloroethylene	86	1 of 47
Phenols	64	9 of 47
Bis(2-Ethylhexyl)Phthalate	26	7 of 47
Di-N-Butyl Phthalate	52	1 of 47
Di-N-Octyl Phthalate	78	2 of 47
Diethyl Phthalate	70	3 of 47
Trichloroethylene	97	1 of 47

Source: USEPA's Region 8 *Technically-Based Local Limits Development Strategy*, April 11, 2003, page 113.

Table B2. Primary Treatment Removal Efficiencies[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Pollutant	Median (%)	No. of POTWs with Removal Data[b]
Metal/Nonmetal Inorganics		
Cadmium	15	6 of 40
Chromium, Total	27	12 of 40
Copper	22	12 of 40
Cyanide	27	12 of 40
Lead	57	1 of 40
Mercury	10	8 of 40
Nickel	14	9 of 40
Silver	20	4 of 40
Zinc	27	12 of 40
Organics		
1,1,1-Trichloroethane	40	10 of 40
1,2-trans-Dichloroethylene	36	9 of 40
Benzene	25	8 of 40
Butyl benzyl phthalate	62	4 of 40
Chloroform	14	11 of 40
Diethyl phthalate	56	1 of 40
Di-n-butyl phthalate	36	3 of 40
Ethylbenzene	13	12 of 40
Naphthalene	44	4 of 40
Phenol	8	11 of 40
Tetrachloroethylene	4	12 of 40
Trichloroethylene	20	12 of 40

[a] Pollutant removals between POTW influent and primary effluent. From *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume I (EPA 440/1-82/303), USEPA, Washington, DC, September 1982, page 61.

[b] Median removal efficiencies from a database of removal efficiencies for 40 POTWs. Only POTWs with average influent concentrations exceeding three times each pollutant's detection limit were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-55, Table 3-9.

Table B3. Removal Efficiencies Through Activated Sludge Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Arsenic	11-78	31	45	53	5 of 26
Cadmium	25-99	33	67	91	19 of 26
Chromium	25-97	68	82	91	25 of 26
Copper	2-99	67	86	95	26 of 26
Cyanide	3-99	41	69	84	25 of 26
Lead	1-92	39	61	76	23 of 26
Mercury	1-95	50	60	79	20 of 26
Molybdenum[c]	6-71		29		6
Nickel	2-99	25	42	62	23 of 26
Selenium	25-89	33	50	67	4 of 26
Silver	17-95	50	75	88	24 of 26
Zinc	23-99	64	79	88	26 of 26
Organics[b]					
1,1,1-Trichloroethane	18-99	75	85	94	23 of 26
1,2-trans-Dichloroethylene	17-99	50	67	91	17 of 26
Anthracene	29-99	44	67	1	5 of 26
Benzene	25-99	50	80	96	18 of 26
Bis (2-ethylhexyl) phthalate	17-99	47	72	87	25 of 26
Butyl benzyl phthalate	25-99	50	67	92	16 of 26
Chloroform	17-99	50	67	83	24 of 26
Diethyl phthalate	17-98	39	62	90	15 of 26
Di-n-butyl phthalate	11-97	39	64	87	19 of 26
Ethylbenzene	25-99	67	86	97	25 of 26
Methylene Chloride	2-99	36	62	77	26 of 26
Naphthalene	25-98	40	78	90	16 of 26
Phenanthrene	29-99	37	68	86	6 of 26
Phenol	3-99	75	90	98	19 of 26
Pyrene	73-95	76	86	95	2 of 26
Tetrachloroethylene	15-99	50	80	93	26 of 26
Toluene	25-99	80	93	98	26 of 26
Trichloroethylene	20-99	75	89	98	25 of 26

[a] Pollutant removals between POTW influent and secondary effluent (including secondary clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All secondary activated sludge treatment plants sampled as part of the study were considered.

[c] Source: USEPA Region 8, Technically Based Local Limits Development Strategy, April 11, 2003.

Source (unless otherwise noted): *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-57, Table 3-11.

Table B4. Removal Efficiencies Through Tertiary Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Cadmium	33-81	50	50	73	3 of 4
Chromium	22-93	62	72	89	4 of 4
Copper	8-99	58	85	98	4 of 4
Cyanide	20-93	32	66	83	4 of 4
Lead	4-86	9	52	77	3 of 4
Mercury	33-79	43	67	75	4 of 4
Nickel	4-78	17	17	577	3 of 4
Silver	27-87	55	62	82	3 of 4
Zinc	1-90	50	78	88	4 of 4
Organics[b]					
1,1,1-Trichloroethane	50-98	79	94	97	4 of 4
1,2-trans-Dichloroethylene	50-96	50	83	93	2 of 4
Benzene	5-67	40	50	54	2 of 4
Bis (2-ethylhexyl) phthalate	45-98	59	76	94	4 of 4
Butyl benzyl phthalate	25-94	50	63	85	4 of 4
Chloroform	16-75	32	53	64	3 of 4
Diethyl phthalate	20-57	29	38	50	3 of 4
Di-n-butyl phthalate	14-84	27	50	70	4 of 4
Ethylbenzene	65-95	80	89	94	3 of 4
Methylene Chloride	11-96	31	57	78	4 of 4
Naphthalene	25-94	33	73	86	3 of 4
Phenol	33-98	80	88	96	4 of 4
Tetrachloroethylene	67-98	80	91	97	4 of 4
Toluene	50-99	83	94	97	4 of 4
Trichloroethylene	50-99	62	93	98	4 of 4

[a] Pollutant removals between POTW influent and tertiary effluent (including final clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.
Tertiary treatment was taken to include POTWs with effluent microscreening, mixed media filtration, post aeration, and/or nitrification/denitrification.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All tertiary treatment plants sampled as part of the study were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-58, Table 3-12.

Table B5. Activated Sludge Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	1	1-10	Unknown
Chromium, Total	1	1-100	Pilot
Chromium III	10	10-50	Unknown
Chromium VI	1	1	Unknown
Copper	1	1	Pilot
Lead	0.1	0.1-5.0	Unknown
		10-100	Lab
Nickel	1	1.0-2.5	Unknown
		5	Pilot
Zinc	0.08	0.08-5	Unknown
		5-10	Pilot
Arsenic	0.1	0.1	Unknown
Mercury	0.1	0.1-1	Unknown
		2.5 as Hg(II)	Lab
Silver	0.25	0.25-5	Unknown
Cyanide	0.1	0.1-5	Unknown
		5	Full
Ammonia	480	480	Unknown
Iodine	10	10	Unknown
Sulfide	25	25-30	Unknown
Organics			
Anthracene	500	500	Lab
Benzene	100	100-500	Unknown
		125-500	Lab
2-Chlorophenol	5	5	Unknown
		20-200	Unknown
1,2 Dichlorobenzene	5	5	Unknown
1,3 Dichlorobenzene	5	5	Unknown
1,4 Dichlorobenzene	5	5	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dimethylphenol	50	40-200	Unknown
2,4-Dinitrotoluene	5	5	Unknown
1,2-Diphenylhydrazine	5	5	Unknown
Ethylbenzene	200	200	Unknown
Hexachlorobenzene	5	5	Unknown
Naphthalene		500	Lab
		500	Unknown
		500	Unknown
Nitrobenzene	30	30-500	Unknown
		500	Lab
		500	Unknown
Pentachlorophenol	0.95	0.95	Unknown
		50	Unknown
		75-150	Lab
Phenathrene	500	500	Lab
		500	Unknown
Phenol	50	50-200	Unknown
		200	Unknown
		200	Unknown
Toluene	200	200	Unknown
1,2,6 Trichlorophenol	50	50-100	Lab
Surfactants	100	100-500	Unknown

[a] References/Sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program*; pages 3-44 and 3-45, Table 3-2.

Table B6. Nitrification Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	5.2	5.2	Lab
Chromium, Total	0.25	0.25-1.9	Unknown
Chromium VI	1	1-10	As CrO_4^{2-}; Unknown
Copper	0.05	0.05-0.48	Unknown
Lead	0.5	0.5	Unknown
Nickel	0.25	0.25-0.5	Unknown
		5	Pilot
Zinc	0.08	0.08-0.5	Unknown
Arsenic		1.5	Unknown
Cyanide	0.34	0.34-.5	Unknown
Chloride		180	Unknown
Organics			
Chloroform	10	10	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dinitrophenol	150	150	Unknown
Phenol	4	4	Unknown
		4-10	Unknown

[a] References/sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-47, Table 3-4.

Table B7. Domestic/Commercial Pollutant Loadings Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	USEPA Literature Values[a]				
	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)
Metal/Nonmetal Inorganics					
Arsenic	140	205	0.0004	0.088	0.007
Barium	3	3	0.04	0.216	0.115
Boron	4	4	0.1	0.42	0.3
Cadmium	361	538	0.00076	0.11	0.008
Chromium III	1	2	<0.005	0.007	0.006
Chromium, Total	311	522	<0.001	1.2	0.034
Copper	603	607	0.005	0.74	0.14
Cyanide	7	7	0.01	0.37	0.082
Fluoride	2	2	0.24	0.27	0.255
Iron	18	18	0.0002	3.4	0.989
Lead	433	540	0.001	2.04	0.058
Lithium	2	2	0.03	0.031	0.031
Manganese	3	3	0.04	0.161	0.087
Mercury	218	235	<0.0001	0.054	0.002
Nickel	313	540	<0.001	1.6	0.047
Phosphate	2	2	27.4	30.2	28.8
Total Phosphorus	1	1	0.7	0.7	0.7
Silver	181	224	0.0007	1.052	0.019
Zinc	636	638	0.01	1.28	0.231
Organics					
Chloroform	21	30	<0.002	0.069	0.009
1,1-Dichloroethene	2	29	0.005	0.008	0.007
1,1-Dichloroethane	1	28	0.026	0.026	0.026
Trans-1,2-Dichloroethene	1	28	0.013	0.013	0.013
Fluoranthene	2	5	0.00001	<0.001	0.001
Methylene Chloride	7	30	0.00008	0.055	0.027
Phenols	2	2	0.00002	0.00003	0.000025
Bis(2-ethylhexyl)Phthalate	5	5	0.00002	0.022	0.006
Pyrene	2	3	0.00001	<0.005	0.0002
Tetrachloroethylene	5	29	0.00001	0.037	0.014
1,2,4-Trichlorobenzene	1	3	<0.002	0.035	0.013
Pesticides					
Total BHC	3	3	0.001	0.001	0.001
4,4-DDD	3	3	0.00026	0.0004	0.0003
Total Endosulfan	3	3	0.002	0.002	0.002

[a] Source: USEPA *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Programs*, May 1991.

Appendix C: Regulatory Limits and Criteria

Table C1. Influent Basis of Design for Fitzgerald Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Parameter	Fitzgerald Creek WPCP Design Influent Criteria[a]	
	Maximum Day	Maximum Month
Biochemical Oxygen Demand (BOD) (mg/L)	448	187
Chemical Oxygen Demand[b] (COD) (mg/L)	950	396
Ammonia (mg/L)	76	32
Suspended Solids, Total (TSS) (mg/L)	431	187
Total Kjeldahl Nitrogen (TKN) (mg/L)	106.0	45.0
Phosphorus, Total (as P) (mg/L)	16.0	6.8
Minimum Temperature, °C (Winter)	13	13
Minimum Temperature, °C (Summer)	17-20	17-20

[a] Influent-based design criteria are from the September 2011 *Rose Creek WWTP and Fitzgerald Creek WWTP Capacity Assessment* prepared for Cherokee County Water & Sewerage Authority.

[b] Design Criteria for COD is based on a COD/BOD ratio of 2.12.

Table C2. NPDES Permit Limits for Fitzgerald Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority				
Parameter	Fitzgerald Creek WPCP Discharge Limitations to the Little River[a]		Fitzgerald Creek WPCP Future Discharge Limitations to the Little River[a]	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
Flow, mgd	5.0	6.25	11.75	14.69
Biochemical Oxygen Demand (BOD), mg/L (kg/day)	5.0 (95)	7.5 (118)	4.0 (178)	6.0 (223)
Total Suspended Solids (TSS), mg/L (kg/day)	20 (379)	30 (474)	20 (891)	30 (1114)
Fecal Coliform (#/100 mL)	200	400	200	400
Ammonia, as N mg/L (kg/day)	1.5 (28)	2.3 (36)	1.1 (47)	1.7 (61)
Total Phosphorus, as P, mg/L (kg/day)	0.33 (6.3)	0.50 (7.8)	0.14 (6.2)	0.21 (7.8)
pH, Minimum to Maximum, Standard Unit (SU)	6.0 to 8.5		6.0 to 8.5	
Dissolved Oxygen (DO), Minimum, mg/L	6.0		6.0	
Temperature (F)	Report		Report	
Ortho-Phosphate, as P	Report		Report	
Nitrate-Nitrite, as N	Report		Report	
Total Kjeldahl Nitrogen, as N	Report		Report	
Long Term Biochemical Oxygen Demand	Report		Report	
Whole Effluent Toxicity (WET) Test	Report NOEC		Report NOEC	
Priority Pollutants	-		Report	

[a] Discharge limitations are from the Fitzgerald Creek Water Pollution Control Plant, NPDES Permit No. GA0038555, effective June 1, 2015.

Table C3. Biosolids Land Application and Landfill Regulatory Limits
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Parameter	Ceiling Concentration (Table 1, 40 CFR 503.13)[a]		Cumulative Pollutant Loading Rates (Table 2, 40 CFR 503.13)[a]		Monthly Average Pollutant Concentration (Table 3, 40 CFR 503.13)[a]		Landfill Disposal - TCLP Regulatory Level[b]		Most Stringent Criteria (mg/kg-dry)
	mg/kg-dry	lb/1,000 lbs-dry	kg/hectare-dry	lb/acre-dry	mg/kg-dry	lb/1,000 lb-dry	mg/L	mg/kg-dry	
Inorganic Pollutants									
Arsenic	75	75	41	37	41	41	5.0	100	41
Barium	-----	-----	-----	-----	-----	-----	100	2000	2000
Cadmium	85	85	39	35	39	39	1.0	20	20
Chromium, Total	-----	-----	-----	-----	-----	-----	5.0	100	100
Copper	4,300	4,300	1,500	1,338	1,500	1,500	-----	-----	1500
Lead	840	840	300	268	300	300	5.0	100	100
Mercury	57	57	17	15	17	17	0.2	4.0	4.00
Molybdenum	75	75	-----	-----	-----	-----	-----	-----	75
Nickel	420	420	420	375	420	420	-----	-----	420
Selenium	100	100	100	89	100	100	1.0	20	20
Silver	-----	-----	-----	-----	-----	-----	5.0	100	100
Zinc	7,500	7,500	2,800	2,498	2,800	2,800	-----	-----	2800
Organic Pollutants									
Benzene	-----	-----	-----	-----	-----	-----	0.5	10	10
Carbon tetrachloride	-----	-----	-----	-----	-----	-----	0.5	10	10
Chlordane	-----	-----	-----	-----	-----	-----	0.03	0.6	0.6
Chlorobenzene	-----	-----	-----	-----	-----	-----	100	2000	2000
Chloroform	-----	-----	-----	-----	-----	-----	6.0	120	120
Cresol, o-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, m-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, p-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresols	-----	-----	-----	-----	-----	-----	200	4000	4000
D, 2,4-	-----	-----	-----	-----	-----	-----	10.0	200	200
Dichlorobenzene, 1,4-	-----	-----	-----	-----	-----	-----	7.5	150	150
Dichloroethane, 1,2-	-----	-----	-----	-----	-----	-----	0.5	10	10
Dichloroethylene, 1,1-	-----	-----	-----	-----	-----	-----	0.7	14	14
Dinitrotoluene, 2,4-	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Endrin	-----	-----	-----	-----	-----	-----	0.02	0.4	0.4
Heptachlor	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Heptachlor epoxide	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Hexachlorobenzene	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	0.5	10	10
Hexachloroethane	-----	-----	-----	-----	-----	-----	3.0	60	60
Lindane	-----	-----	-----	-----	-----	-----	0.4	8.0	8
Methoxychlor	-----	-----	-----	-----	-----	-----	10	200	200
Methyl ethyl ketone	-----	-----	-----	-----	-----	-----	200	4000	4000
Nitrobenzene	-----	-----	-----	-----	-----	-----	2.0	40	40
Pentachlorophenol	-----	-----	-----	-----	-----	-----	100	2000	2000
Pyridine	-----	-----	-----	-----	-----	-----	5.0	100	100
Tetrachloroethylene	-----	-----	-----	-----	-----	-----	0.7	14	14
Toxaphene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichloroethylene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichlorophenol, 2,4,5-	-----	-----	-----	-----	-----	-----	400	8000	8000
Trichlorophenol, 2,4,6-	-----	-----	-----	-----	-----	-----	2.0	40	40
TP, 2,4,5- (Silvex)	-----	-----	-----	-----	-----	-----	1.0	20	20
Vinyl chloride	-----	-----	-----	-----	-----	-----	0.2	4	4

[a] For the application of biosolids to agricultural land, forest, public contact sites, reclamation sites, a POTW must comply with the Ceiling Concentrations and either the cumulative pollutant loading rates or the monthly average pollutant concentrations (also referred to as the "Clean Sludge" concentrations). Regulations from 40 CFR 503.13, Tables 1-4, October 25, 1995.

[b] Toxicity characteristic leaching procedure (TCLP) is a soil sample extraction method for chemical analysis employed as an analytical method to simulate leaching through a landfill. The testing methodology is used to determine if a waste is characteristically hazardous, i.e., classified as one of the "D" listed wastes by the USEPA. Sludge must comply with the TCLP Regulatory Levels in order to be disposed at a municipal landfill.

Table C4. Derivation of State Water Quality Standard for Metals for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Metal	Georgia WQS for Freshwater							
	Georgia WQS, Dissolved[a] (mg/L)		Conversion Factor (CF) for Acute (CMC)[a]	Conversion Factor (CF) for Chronic (CCC)[a]	Georgia WQS, Dissolved, Adjusted for Receiving Stream Hardness of 25 mg/L[b] (mg/L)		Georgia WQS, Total Recoverable, Adjusted for Receiving Stream Hardness of 25 mg/L[c] (mg/L)	
	Acute (CMC)	Chronic (CCC)			Acute (CMC)	Chronic (CCC)	Acute (CMC)	Chronic (CCC)
Arsenic[d]	0.34	0.15	1.000	1.000	0.34	0.15	0.34	0.15
Cadmium[d,e]	0.0010	0.00015	1.002	0.967	0.00052	0.000094	0.00052	0.000097
Chromium (III)[d,e]	0.32	0.042	0.316	0.86	0.18	0.024	0.579	0.028
Chromium (VI)[d]	0.0160	0.0110	0.982	0.962	0.0160	0.0110	0.0163	0.0114
Chromium, Total	----	----	----	----	----	----	----	----
Copper[d,e]	0.0070	0.0050	0.960	0.960	0.0036	0.0027	0.004	0.0029
Cyanide	----	----	----	----	----	----	----	----
Lead[d,e]	0.030	0.0012	0.993	0.993	0.0139	0.00054	0.0140	0.00054
Mercury	0.0014	0.000012	0.85	0.85	0.0014	0.000012	0.0016	0.000014
Nickel[d,e]	0.26	0.029	0.998	0.997	0.145	0.016	0.145	0.016
Selenium	----	0.005	----	----	----	0.005	----	0.005
Silver	----	----	0.85	----	0.00030	----	0.00035	----
Zinc[d,e]	0.065	0.065	0.978	0.986	0.036	0.036	0.037	0.037

WQS = Water Quality Standard.
CMC = Criterion Maximum Concentration.
CCC = Criterion Continuous Concentration.

[a] Conversion Factors for Acute and Chronic Standards are from the National Recommended Water Quality Criteria, USEPA accessed 12/17/18 and available at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

[b] In-stream criteria for freshwater bodies are from Georgia Rule 391-3-6-.03(5)((3)ii). For those hardness-dependant metals, criteria are calculated from the following:
CMC (dissolved) = exp{mA [ln(hardness)]+ bA} (CF).
CCC (dissolved) = exp{mC [ln(hardness)]+ bC} (CF).

[c] For those metals reported in 391-3-6-.03 in terms of dissolved fraction, total recoverable critera are calculated from the following:
CMC (total) = CMC (dissolved) / CF.
CCC (total) = CCC (dissolved) / CF.

[d] Values are expressed in terms of the dissolved fraction in the water column.

[e] The freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body.

Table C5. Summary of Water Quality Standards for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Acute WQS	Most Stringent Chronic WQS
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS		
Conventional Pollutants (mg/L)							
Ammonia	----	----	----	----	----	----	----
Biochemical Oxygen Demand (BOD)	----	----	----	----	----	----	----
Chemical Oxygen Demand (COD)	----	----	----	----	----	----	----
Phosphorus, Total (as P)	----	----	----	----	----	----	----
Kjeldahl Nitrogen, Total (TKN)	----	----	----	----	----	----	----
Suspended Solids, Total (TSS)	----	----	----	----	----	----	----
Inorganic Pollutants (mg/L)							
Antimony	----	----	----	----	0.64	----	0.64
Arsenic	----	0.34	0.15	----	0.010	0.34	0.010
Cadmium	----	0.00052	0.000097	----	----	0.00052	0.000097
Chromium III	----	0.579	0.028	----	----	0.579	0.028
Chromium VI	----	0.016	0.0114	----	----	0.016	0.0114
Chromium, Total	----	----	----	----	----	----	----
Copper	----	0.0038	0.0029	----	----	0.0038	0.0029
Cyanide	----	----	----	0.0052	----	----	0.0052
Lead	----	0.0140	0.00054	----	----	0.0140	0.00054
Mercury	----	0.001647	0.000014	----	----	0.001647	0.000014
Molybdenum	----	----	----	----	----	----	----
Nickel	----	0.145	0.016	----	----	0.145	0.016
Selenium	----	----	0.005	----	----	----	0.005
Silver	----	0.00035	----	----	----	0.00035	----
Thallium	----	----	----	----	0.00047	----	0.00047
Zinc	----	0.037	0.037	----	----	0.037	0.037
Organic Pollutants (ug/L)							
Acenaphthene	----	----	----	----	990	----	990
Acrolein	----	----	----	----	9.3	----	9.3
Acrylonitrile	----	----	----	----	0.25	----	0.25
Aldrin	----	----	----	----	0.00005	----	0.00005
Anthracene	----	----	----	----	40,000	----	40000
Aroclor 1232 (PCBs)	----	----	----	0.014	----	----	0.014
Aroclor 1242 (PCBs)	----	----	----	0.014	----	----	0.014
Aroclor 1254 (PCBs)	----	----	----	0.014	----	----	0.014
Benzene	----	----	----	----	51	----	51
Benzidine	----	----	----	----	0.0002	----	0.0002
Benzo(a)Anthracene	----	----	----	----	0.018	----	0.018
Benzo(a)Pyrene	----	----	----	----	0.018	----	0.018
Benzo(k)Fluoroethene	----	----	----	----	0.018	----	0.018
Benzofluoranthene, 3,4-	----	----	----	----	0.018	----	0.018
BHC-Alpha, a-	----	----	----	----	0.0049	----	0.0049
BHC-Beta, b-	----	----	----	----	0.017	----	0.017
Bis(2-chloroethyl)Ether	----	----	----	----	0.53	----	0.53
Bis(2-chloroisopropyl)Ether	----	----	----	----	65,000	----	65,000
Bis(2-chloromethyl)Ether	----	----	----	----	----	----	----
Bis(2-ethylhexyl)Phthalate	----	----	----	----	2.2	----	2.2
Bromoform	----	----	----	----	140	----	140
Butylbenzyl Phthalate	----	----	----	----	1,900	----	1,900
Carbon Disulfide	----	----	----	----	----	----	----
Carbon Tetrachloride	----	----	----	----	1.6	----	1.6
Chlordane	----	----	----	0.0043	0.00081	----	0.00081
Chlorobenzene	----	----	----	----	1,600	----	1,600
Chlorodibromomethane	----	----	----	----	13	----	13
Chloroethane	----	----	----	----	----	----	----
Chloroform	----	----	----	----	470	----	470
Chloronaphthalene, 2-	----	----	----	----	1,600	----	1,600

Table C5. Summary of Water Quality Standards for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Acute WQS	Most Stringent Chronic WQS
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS		
Chlorophenol, 2-	----	----	----	----	150	----	150
Chrysene	----	----	----	----	0.018	----	0.018
DDD, 4,4'-	----	----	----	----	0.00031	----	0.00031
DDE, 4,4'-	----	----	----	----	0.00022	----	0.00022
DDT, 4,4'-	----	----	----	0.001	0.0002	----	0.00022
Dibenzo(a,h)Anthracene	----	----	----	----	0.018	----	0.018
Dichlorobenzene, 1,2-	----	----	----	----	1,300	----	1,300
Dichlorobenzene, 1,3-	----	----	----	----	960	----	960
Dichlorobenzene, 1,4-	----	----	----	----	190	----	190
Dichlorobenzidine, 3,3-	----	----	----	----	0.028	----	0.028
Dichlorobromomethane	----	----	----	----	17	----	17
Dichlorodifluoromethane	----	----	----	----	----	----	----
Dichlorofluoromethane	----	----	----	----	----	----	----
Dichloroethane, 1,1-	----	----	----	----	----	----	----
Dichloroethane, 1,2-	----	----	----	----	37	----	37
Dichloroethylene, 1,1-	----	----	----	----	7,100	----	7,100
Dichloroethylene, trans-1,2-	----	----	----	----	10,000	----	10,000
Dichlorophenol, 2,4-	----	----	----	----	290	----	290
Dichloropropane, 1,2-	----	----	----	----	15	----	15
Dichloropropylene, 1,3-	----	----	----	----	21	----	21
Dieldrin	----	----	----	0.056	0.000054	----	0.000054
Diethyl phthalate	----	----	----	----	44,000	----	44,000
Dimethyl phthalate	----	----	----	----	1,100,000	----	1,100,000
Dimethylphenol, 2,4-	----	----	----	----	850	----	850
Di-n-butyl phthalate	----	----	----	----	4,500	----	4,500
Dinitro-o-cresol, 4,6-	----	----	----	----	----	----	----
Dinitrophenol, 2,4-	----	----	----	----	5,300	----	5,300
Dinitrophenol, 2-Methyl-4,6-	----	----	----	----	280	----	280
Dinitrotoluene, 2,4-	----	----	----	----	3.4	----	3.4
Diphenylhydrazine, 1,2-	----	----	----	----	0.2	----	0.2
Endosulfan Sulfate	----	----	----	----	89	----	89
Endosulfan, alpha-	----	----	----	0.056	89	----	0.056
Endosulfan, beta-	----	----	----	0.056	89	----	0.056
Endrin	----	----	----	0.036	0.06	----	0.036
Endrin Aldehyde	----	----	----	----	0.3	----	0.3
Ethylbenzene	----	----	----	----	2,100	----	2,100
Fluoranthene	----	----	----	----	140	----	140
Fluorene	----	----	----	----	5,300	----	5,300
Formaldehyde	----	----	----	----	----	----	----
Heptachlor	----	----	----	0.0038	0.000079	----	0.000079
Heptachlor Epoxide	----	----	----	0.0038	0.000039	----	0.000039
Hexachlorobenzene	----	----	----	----	0.00029	----	0.00029
Hexachlorobutadiene	----	----	----	----	18	----	18
Hexachlorocyclopentadiene	----	----	----	----	1,100	----	1,100
Hexachloroethane	----	----	----	----	3.3	----	3.3
Indeno(1,2,3-cd)Pyrene	----	----	----	----	0.018	----	0.018
Isophorone	----	----	----	----	960	----	960
Lindane	----	0.95	----	----	1.8	0.95	1.8
Methyl Bromide (Bromomethane)	----	----	----	----	1,500	----	1,500
Methyl Chloride (Chloromethane)	----	----	----	----	----	----	----
Methyl ethyl ketone (2-Butanone)	----	----	----	----	----	----	----
Methyl isobutyl ketone (MIBK)	----	----	----	----	----	----	----
Methylene blue active substances (MBAS)	----	----	----	----	----	----	----
Methylene chloride	----	----	----	----	590	----	590

Table C5. Summary of Water Quality Standards for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)		
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS	Acute WQS	Most Stringent Chronic WQS
Methoxychlor	----	----	----	----	0.03	----	0.03
Napthalene	----	----	----	----	----	----	----
Nitrobenzene	----	----	----	----	690	----	690
N-Nitrosodimethylamine	----	----	----	----	3.0	----	3.0
N-Nitrosodiphenylamine	----	----	----	----	6.0	----	6.0
Nonylphenol	----	----	----	----	----	----	----
PCBs	----	----	----	0.014	0.000064	----	0.000064
Pentachlorophenol	----	----	----	15	3.0	----	3.0
Phenanthrene	----	----	----	----	----	----	----
Phenol	----	----	----	300	857,000	----	300
Pyrene	----	----	----	----	4,000	----	4,000
Silvex (2,4,5-TP)	50	----	----	----	----	----	50
Tetrachloroethane, 1,1,2,2-	----	----	----	----	4.0	----	4.0
Tetrachloroethylene	----	----	----	----	3.3	----	3.3
Toluene	----	----	----	----	5,980	----	5,980
Toxaphene	----	----	----	0.0002	0.00028	----	0.00020
Trichlorobenzene, 1,2,4-	----	----	----	----	70	----	70
Trichloroethane, 1,1,1-	----	----	----	----	----	----	----
Trichloroethane, 1,1,2-	----	----	----	----	16	----	16
Trichloroethylene	----	----	----	----	30	----	30
Trichlorofluoromethane	----	----	----	----	----	----	----
Trichlorophenol, 2,4,6-	----	----	----	----	2.4	----	2.4
Vinyl Chloride	----	----	----	----	2.4	----	2.4
Other Pollutants							
Oil and Grease	----	----	----	----	----	----	----
Sulfide	----	----	----	----	----	----	----
Iodine	----	----	----	----	----	----	----
Surfactants	----	----	----	----	----	----	----
Sodium	----	----	----	----	----	----	----
Chloride	----	----	----	----	----	----	----
Hydrogen Sulfide	----	----	----	----	----	----	----

WQS = Water Quality Standard.

[a] In-stream criterion from Georgia Rule 391-3-6-.03, revised on October 22, 2015. For metals, values are expressed in terms of the total recoverable fraction in the water column (refer to Table D3).

Table C6. Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels[a]		Most Stringent Screening Level for Worker Protection (mg/L)
	Based on Fume Toxicity (mg/L)	Based on Explosivity (mg/L)	
Acrolein	0.047	13,163	0.047
Acrylonitrile	4.822	14,586	4.822
Benzene	0.014	169	0.014
Bromoform	0.227		0.227
Carbon Tetrachloride	0.011		0.011
Chlorobenzene	2.290	395	2.290
Chloroethane	5.880	222	5.880
Chloroform	0.060		0.060
Dichloroethane, 1,1-	1.685	909	1.685
Dichloroethane, 1,2-	0.168	5,221	0.168
Dichloroethylene, 1,1-	0.016	215	0.016
Dichloroethylene, trans-1,2-	2.040	571	2.040
Dichloropropane, 1,2-	4.289	1,326	4.289
Ethylbenzene	1.659	106	1.659
Hydrogen Cyanide	1.149	13,529	1.149
Hydrogen Sulfide	0.034	96	0.034
Methyl Bromide (Bromomethane)	0.305	1,521	0.305
Methyl Chloride (Chloromethane)	0.557	450	0.557
Methylene chloride	4.139	4,307	4.139
Tetrachloroethane, 1,1,2,2-	1.847		1.847
Toluene	2.075	152	2.075
Trichloroethane, 1,1,1-	2.759	591	2.759
Trichloroethane, 1,1,2-	1.601	9,611	1.601
Trichloroethylene	0.026	1,029	0.026
Vinyl Chloride	0.012	88	0.012

[a] Source: EPA Guidance Manual - Local Limits Development Guidance, Appendix I.

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Acrylonitrile	1.19	1794	1.19
Aldrin	0.38		0.38
Aroclor 1242	0.01		0.01
Aroclor 1254	0.005		0.005
Benzene	0.13	20	0.13
Bis(2-chloromethyl)Ether	0.0005		0.0005
Bromoform	0.24		0.24
Carbon Disulfide	0.06	6.3	0.06
Carbon Tetrachloride	0.03		0.03
Chlordane	1.27		1.27
Chlorobenzene	2.31	40	2.31
Chloroethane	0.42	1.6	0.42
Chloroform	0.41		0.41
Dichlorobenzene, 1,2-	3.75	165	3.75
Dichlorobenzene, 1,4-	3.55	104	3.55
Dichlorodifluoromethane	0.04		0.04
Dichloroethane, 1,1-	4.58	128	4.58
Dichloroethane, 1,2-	1.05	660	1.05
Dichloroethylene, 1,1-	0.003	3.3	0.003
Dichloroethylene, trans-1,2-	0.28	14	0.28
Dichloropropane, 1,2-	3.62	164	3.62
Dichloropropylene, 1,3-	0.08	435	0.08
Dieldrin	13		13
Diethyl phthalate	107		107
Dinitro-o-cresol, 4,6-	10.78		10.78
Dinitrotoluene, 2,4-	7.21		7.21
Endrin	4.9		4.9
Ethylbenzene	1.59	16	1.59
Formaldehyde	0.06	412	0.06
Heptachlor	0.003		0.003
Hexachlorobutadiene	0.0002		0.0002
Hexachlorocyclopentadiene	658		658
Hexachloroethane	0.093		0.093
Methyl Bromide (Bromomethane)	0.002	4.7	0.002
Methyl Chloride (Chloromethane)	0.06	1.1	0.06
Methyl ethyl ketone	249	2486	249
Methylene chloride	2.06	494	2.06
Napthalene	2.65	240	2.65

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Nitrobenzene	9.41	17046	9.41
Pentachlorophenol	4.37		4.37
Phenol	1,024		1,024
Tetrachloroethane, 1,1,2,2-	0.44		0.44
Tetrachloroethylene	0.53		0.53
Toluene	1.36	17	1.36
Toxaphene	0.003		0.003
Trichlorobenzene, 1,2,4-	0.39	197	0.39
Trichloroethane, 1,1,1-	1.55	33	1.55
Trichloroethane, 1,1,2-	1.15		1.15
Trichloroethylene	0.71	114	0.71
Trichlorofluoromethane	1.23		1.23
Vinyl Chloride	0.0003	2.2	0.0003

[a] Gas/Vapor Toxicity Screening Levels from Tables 4-2 and/or B-1 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

[b] Explosivity Screening Levels from Table 4-2 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

Appendix D: Maximum Allowable Headworks Loadings Analysis for the Fitzgerald Creek WPCP

Table D1. Maximum Allowable Headworks Loading Analysis for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

WPCP Name:	Fitzgerald Creek Water Pollution Control Plant
Date:	9-Mar-20
Average WPCP Flow (mgd):	11.75
Total Actual Industrial Flow (mgd):	1.175
Septic/Hauled Waste Flow (mgd):	0
Domestic/Commercial Flow (mgd):	10.58
Dry Sludge to Disposal (tons/day):	226
Dry Sludge to Disposal (lb/day):	411,305
Sludge Percent Solids (%)	NA
Specific Gravity of Sludge (kg/L)	NA
NPDES Permit Number:	GA0038555
NPDES Permitted Discharge (mgd):	11.75
Receiving Stream:	Little River
1Q10 Stream Flow (cfs):	4.66
1Q10 Stream Flow (mgd):	3.00
7Q10 Stream Flow (cfs):	5.45
7Q10 Stream Flow (mgd):	3.51
Stream Classification:	Fishing
Safety and Growth Factor (%):	10

Table D2. Local Limits Determination Based on Design Criteria for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Design Criteria (mg/L) (DC)	NPDES Permitted Flow (mgd) (Q_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{DESIGN})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Allowable Industrial Loading (lb/day) (AIL_{DESIGN})	Industrial Local Limit (mg/L) ($C_{LIM-DESIGN}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants														
Ammonia	1.175	11.750	11.750	0		10.58	16.5	76	11.75	7448	1453	5249.8	536	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	0		10.58	120	448	11.75	43902	10545	28967	2956	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	0		10.58	253	950	11.75	93072	22355	61409	6267	10
Phosphorus, Total (as P)	1.175	11.750	11.750	0		10.58	3.64	16	11.75	1568	321	1090	111	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	0		10.58	128	431	11.75	42236	11315	26697	2724	10
Inorganic Pollutants														
Antimony	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Arsenic	1.175	11.750	11.750	0		10.58	0.002		11.75	-----	0.15	-----	-----	10
Cadmium	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Chromium III	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Chromium VI	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Chromium, Total	1.175	11.750	11.750	0		10.58	0.002		11.75	-----	0.18	-----	-----	10
Copper	1.175	11.750	11.750	0		10.58	0.027		11.75	-----	2.4	-----	-----	10
Cyanide	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Lead	1.175	11.750	11.750	0		10.58	0.001		11.75	-----	0.1	-----	-----	10
Mercury	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Molybdenum	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Nickel	1.175	11.750	11.750	0		10.58	0.002		11.75	-----	0.22	-----	-----	10
Selenium	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Silver	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Zinc	1.175	11.750	11.750	0		10.58	0.139		11.75	-----	12.2	-----	-----	10
Organic Pollutants														
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	0		10.58	0.000		11.75	-----	0.002	-----	-----	10
Chloroform	1.175	11.750	11.750	0		10.58	0.0000		11.75	-----	0.002	-----	-----	10
Phenol	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Other Pollutants														
Oil and Grease	1.175	11.750	11.750	0		10.58			11.75	-----	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	0		10.58		106	11.75	10387	0	9349	954	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(AIL_{DESIGN})	Allowable industrial loading to the WPCP in lb/day
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	($C_{LIM-DESIGN}$)	Local limits for industrial users in mg/L.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(SGF)	Safety and growth factor as a percent.
(DC)	The pollutant concentration the WPCP was designed to treat in mg/L.	8.34	Unit conversion factor.
(Q_{NPDES})	NPDES permitted flow for the POTW in mgd.		

Table D3. Local Limits Determination Based on Monthly NPDES Permit Levels for Fitzgerald Creek WPCP for Discharge to the Little River
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Pollutant Loading[a] (mg/L) (PL)	Domestic & Commercial Bkgd Conc.[a,b] (mg/L) (C_{DOM})	Septic/Hauled Waste Conc.[a,c] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	NPDES Monthly Limit for Discharge (mg/L) (C_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{NPDES})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{NPDES})	Industrial Local Limit (mg/L) ($C_{LIM-NPDES}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																
Ammonia	1.175	11.750	11.750	10.575	0	16.5	16.5		99.62	1.10	28367	1453	0	24077	2457	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	10.575	0	120	120		99.01	4.00	39594	10545	0	25090	2560	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	10.575	0	253	253				-----	22355	0	-----	-	10
Phosphorus, Total (as P)	1.175	11.750	11.750	10.575	0	3.64	3.64		98.14	0.14	738	321	0	343	35	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	10.575	0	128	128		99.33	20	292522	11315	0	251955	25711	10
Inorganic Pollutants																
Antimony	1.175	11.750	11.750	10.575	0	*0.0003*					-----	0	0	-----	-	10
Arsenic	1.175	11.750	11.750	10.575	0	0.0018	0.0018		2.9		-----	0.15	0	-----	-	10
Cadmium	1.175	11.750	11.750	10.575	0	*0.00005*			50		-----	0	0	-----	-	10
Chromium III	1.175	11.750	11.750	10.575	0				72		-----	0	0	-----	-	10
Chromium VI	1.175	11.750	11.750	10.575	0	*0.0050*			72		-----	0	0	-----	-	10
Chromium, Total	1.175	11.750	11.750	10.575	0	0.0021	0.0021		32.9		-----	0.18	0	-----	-	10
Copper	1.175	11.750	11.750	10.575	0	0.0272	0.0272		94.5		-----	2.40	0	-----	-	10
Cyanide	1.175	11.750	11.750	10.575	0	*0.013*			66		-----	0	0	-----	-	10
Lead	1.175	11.750	11.750	10.575	0	0.00105	0.00105		74.52		-----	0.09	0	-----	-	10
Mercury	1.175	11.750	11.750	10.575	0	*0.00002*			67		-----	0	0	-----	-	10
Molybdenum	1.175	11.750	11.750	10.575	0				29		-----	0	0	-----	-	10
Nickel	1.175	11.750	11.750	10.575	0	0.0025	0.0025		18		-----	0.22	0	-----	-	10
Selenium	1.175	11.750	11.750	10.575	0	*0.00090*			50		-----	0	0	-----	-	10
Silver	1.175	11.750	11.750	10.575	0	*0.00010*			62		-----	0	0	-----	-	10
Zinc	1.175	11.750	11.750	10.575	0	0.1385	0.1385		79		-----	12.2	0	-----	-	10
Organic Pollutants																
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	10.575	0	0.0142	0.0060		88.9		-----	0.53	0	-----	-	10
Chloroform	1.175	11.750	11.750	10.575	0	0.0014	0.0014		53.6		-----	0.12	0	-----	-	10
Phenols	1.175	11.750	11.750	10.575	0	0.0202	0.000025		92.7		-----	0.002	0	-----	-	10
Other Pollutants																
Oil and Grease	1.175	11.750	11.750	10.575	0						-----	0	0	-----	-	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	10.575	0	48			98.21		-----	0	0	-----	-	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

[b] If the domestic and commercial background concentration was greater than the pollutant loading, the pollutant loading was used as the domestic and commercial background concentration. If the domestic and commercial background concentration was greater than a non-detect pollutant loading, the domestic and commercial background concentration was assumed to be negligible.

[c] Values in red are literature values from Appendix L from the USEPA Local Limits Development Guidance Document Appendices.

(Q_{IND})	Industrial flow in mgd.	(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{NPDES})	NPDES monthly average permit limit for a particular pollutant in mg/L.	8.34	Unit conversion factor.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{NPDES})	Allowable headworks pollutant loading to the WPCP in lb/day.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.		
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.		
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{NPDES})	Allowable industrial loading to the WPCP in lb/day.		
(PL)	Pollutant concentration in influent in mg/L.	($C_{LIM-NPDES}$)	Local limits for industrial users in mg/L.		

Table D4. Local Limits Determination Based on Activated Sludge Inhibition Threshold Levels for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{PRIM})	A.S. Inhibition Level (mg/L) (C_{INHIB1})	Allowable Headworks Loading (lb/day) (AHL_{SEC1})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC1})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC1}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.175	11.750	11.750	10.575	16.47	0			480	47038	1453	0	40881	4172	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	10.575	119.56	0				-----	10545	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	10.575	253.472	0				-----	22355	0	-----	-----	10
Phosphorus, Total (as P)	1.175	11.750	11.750	10.575	3.641	0				-----	321	0	-----	-----	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	10.575	128.29	0				-----	11315	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Arsenic	1.175	11.750	11.750	10.575	0.0018	0			0.1	9.8	0.15	0	8.7	0.88	10
Cadmium	1.175	11.750	11.750	10.575		0		15	5.5	634	0	0	571	58.24	10
Chromium III	1.175	11.750	11.750	10.575		0			30	2940	0	0	2646	270.0	10
Chromium VI	1.175	11.750	11.750	10.575		0			1	98	0	0	88	9.00	10
Chromium, Total	1.175	11.750	11.750	10.575	0.0021	0		27	50.5	6779	0.18	0	6101	622.58	10
Copper	1.175	11.750	11.750	10.575	0.0272	0		22	1	126	2.4	0	111	11.29	10
Cyanide	1.175	11.750	11.750	10.575		0		27	2.55	342.3	0	0	308.08	31.44	10
Lead	1.175	11.750	11.750	10.575	0.0011	0		57	2.55	581.1	0.1	0	522.93	53.36	10
Mercury	1.175	11.750	11.750	10.575		0		10	0.55	59.9	0	0	53.9	5.50	10
Molybdenum	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Nickel	1.175	11.750	11.750	10.575	0.0025	0		14	1.75	199	0.22	0	179	18.29	10
Selenium	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Silver	1.175	11.750	11.750	10.575		0		20	2.63	321.5	0	0	289.4	29.53	10
Zinc	1.175	11.750	11.750	10.575	0.139	0		27	2.9	389	12.2	0	338	34.5	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	10.575	0.0060	0				-----	0.53	0	-----	-----	10
Chloroform	1.175	11.750	11.750	10.575	0.0014	0		14		-----	0.12	0	-----	-----	10
Phenol	1.175	11.750	11.750	10.575	0.0000	0		8	125	13315	0.002	0	11983	1223	10
Other Pollutants															
Oil and Grease	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table D5. Local Limits Determination Based on Nitrification Inhibition Threshold Levels for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{SEC})	Nitrification Inhibition Level (mg/L) (C_{INHIB2})	Allowable Headworks Loading (lb/day) (AHL_{SEC2})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC2})	Industrial Local Limit (mg/L) ($C_{LIM-SEC2}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.175	11.750	11.750	10.575	16.47	0				-----	1453	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	10.575	119.56	0				-----	10545	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	10.575	253.472	0				-----	22355	0	-----	-----	10
Phosphorus, Total (as P)	1.175	11.750	11.750	10.575	3.641	0				-----	321	0	-----	-----	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	10.575	128.29	0				-----	11315	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Arsenic	1.175	11.750	11.750	10.575	0.0018	0			1.5	147	0.15	0	132.14	13.48	10
Cadmium	1.175	11.750	11.750	10.575		0		15	5.2	599	0	0	539.55	55.06	10
Chromium III	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Chromium VI	1.175	11.750	11.750	10.575		0			5.5	539.0	0	0	485.08	49.50	10
Chromium, Total	1.175	11.750	11.750	10.575	0.0021	0		27	1.075	144.3	0.18	0	129.70	13.23	10
Copper	1.175	11.750	11.750	10.575	0.0272	0		22	0.265	33.3	2.4	0	27.565	2.813	10
Cyanide	1.175	11.750	11.750	10.575		0		27	0.42	56.4	0	0	50.74	5.18	10
Lead	1.175	11.750	11.750	10.575	0.001	0		57	0.5	113.9	0.1	0	102.46	10.46	10
Mercury	1.175	11.750	11.750	10.575		0		10		-----	0	0	-----	-----	10
Molybdenum	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Nickel	1.175	11.750	11.750	10.575	0.0025	0		14	0.375	42.7	0.22	0	38.24	3.90	10
Selenium	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Silver	1.175	11.750	11.750	10.575		0		20		-----	0	0	-----	-----	10
Zinc	1.175	11.750	11.750	10.575	0.139	0		27	0.29	38.9	12.2	0	22.82	2.33	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	10.575	0.0060	0				-----	0.53	0	-----	-----	10
Chloroform	1.175	11.750	11.750	10.575	0.0014	0		14	10	1139	0.12	0	1025.41	104.64	10
Phenol	1.175	11.750	11.750	10.575	0.00003	0		8	4	426	0.002	0	383.46	39.13	10
Other Pollutants															
Oil and Grease	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	10.575		0				-----	0	0	-----	-----	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor.

Table D6. Local Limits Determination Based on Sludge Disposal for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Dry Sludge to Disposal (lbs/day) (Q_{SLUDGE})	Removal Efficiency[a] (%) (R_{WPCP})	Sludge Criteria (mg/kg) (C_{SLUDGE})	Allowable Headworks Loading (lbs/day) (AHL_{SLUDGE})	Domestic & Commercial Loading (lbs/day) (L_{UNC})	Septic/Hauled Waste Loading (lbs/day) (L_{HW})	Allowable Industrial Loading (lbs/day) (AIL_{SLUDGE})	Industrial Local Limit (mg/L) ($C_{LIM-SLUDGE}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.175	11.750	10.575	16.47	0		411,305	99.62		-----	1453	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	10.575	119.56	0		411,305	99.01		-----	10545	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.175	11.750	10.575	253.472	0		411,305			-----	22355	0	-----	-----	10
Phosphorus, Total (as P)	1.175	11.750	10.575	3.641	0		411,305	98.14		-----	321	0	-----	-----	10
Suspended Solids, Total (TSS)	1.175	11.750	10.575	128.29	0		411,305	99.33		-----	11315	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.175	11.750	10.575		0		411,305			-----	0	0	-----	-----	10
Arsenic	1.175	11.750	10.575	0.0018	0		411,305	2.9	41	580.802	0.15	0	522.57	53.326	10
Cadmium	1.175	11.750	10.575		0		411,305	50	20	16.432	0	0	14.79	1.51	10
Chromium III	1.175	11.750	10.575		0		411,305	72	100	57.06	0	0	51	5.24	10
Chromium VI	1.175	11.750	10.575		0		411,305	72	100	57.06	0	0	51.35	5.24	10
Chromium, Total	1.175	11.750	10.575	0.0021	0		411,305	32.9	100	124.87	0.18	0	112.20	11.45	10
Copper	1.175	11.750	10.575	0.0272	0		411,305	94.5	1500	652.1	2.4	0	584.47	59.64	10
Cyanide	1.175	11.750	10.575		0		411,305	66		-----	0	0	-----	-----	10
Lead	1.175	11.750	10.575	0.0011	0		411,305	74.52	100	55.13	0.1	0	49.52	5.05	10
Mercury	1.175	11.750	10.575		0		411,305	67	4	2.453	0	0	2.21	0.23	10
Molybdenum	1.175	11.750	10.575		0		411,305	29	75	106.24	0	0	95.62	9.76	10
Nickel	1.175	11.750	10.575	0.0025	0		411,305	18	420	958.6	0.22	0	862.49	88.01	10
Selenium	1.175	11.750	10.575		0		411,305	50	20	16.432	0	0	14.79	1.51	10
Silver	1.175	11.750	10.575		0		411,305	62	100	66.26	0	0	59.63	6.09	10
Zinc	1.175	11.750	10.575	0.139	0		411,305	79	2800	1456.0	12.2	0	1298.22	132.48	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.175	11.750	10.575	0.0060	0		411,305	88.9		-----	0.53	0	-----	-----	10
Chloroform	1.175	11.750	10.575	0.0014	0		411,305	53.6	120	91.97	0.12	0	82.65	8.43	10
Phenol	1.175	11.750	10.575	0.0000	0		411,305	92.7		-----	0.00	0	-----	-----	10
Other Pollutants															
Oil and Grease	1.175	11.750	10.575		0		411,305			-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	10.575		0		411,305	98.21		-----	0	0	-----	-----	10

[a] Polluant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lbs/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lbs/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lbs/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lbs/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in m	8.34	Unit conversion factor

Table D7. Local Limits Determination Based on Acute State Water Quality Standards for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	Stream Flow (mgd) (Q_{ASTR})	Upstream Conc. (mg/L) (C_{STR})	Acute State WQS[a] (mg/L) (CA_{WQS})	Allowable Headworks (lb/day) ($AHLA_{WQS}$)	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) ($AILA_{WQS}$)	Industrial Local Limit (mg/L) ($C_{LIM-AWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	1.175	11.750	11.750	10.575	16.47	0		100	3	0.03		-----	1453	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	10.575	119.56	0		99.01	3			-----	10545	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	10.575	253.472	0			3			-----	22355	0	-----	-----	10
Phosphorus, Total (as P)	1.175	11.750	11.750	10.575	3.641	0		98.14	3	0.06		-----	321	0	-----	-----	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	10.575	128.29	0		99.33	3	12.38		-----	11315	0	-----	-----	10
Inorganic Pollutants																	
Antimony	1.175	11.750	11.750	10.575		0			3			-----	0	0	-----	-----	10
Arsenic	1.175	11.750	11.750	10.575	0.0018	0		2.9	3		0.34	43	0.15	0	39	4	10
Cadmium	1.175	11.750	11.750	10.575		0		50	3		0.00052	0.13	0	0	0.12	0.012	10
Chromium III	1.175	11.750	11.750	10.575		0		72	3		0.579	255	0	0	229	23	10
Chromium VI	1.175	11.750	11.750	10.575		0		72	3		0.016	7.16	0	0	6.44	0.658	10
Chromium, Total	1.175	11.750	11.750	10.575	0.0021	0		32.9	3			-----	0.18	0	-----	-----	10
Copper	1.175	11.750	11.750	10.575	0.0272	0		94.5	3		0.0038	8.48	2.40	0	5.24	0.53	10
Cyanide	1.175	11.750	11.750	10.575		0		66	3			-----	0	0	-----	-----	10
Lead	1.175	11.750	11.750	10.575	0.001	0		74.52	3		0.0140	6.8	0.09	0	6.0	0.61	10
Mercury	1.175	11.750	11.750	10.575		0		67	3		0.001647	0.6	0	0	0.6	0.06	10
Molybdenum	1.175	11.750	11.750	10.575		0		29	3			-----	0	0	-----	-----	10
Nickel	1.175	11.750	11.750	10.575	0.0025	0		18	3		0.145	22	0.22	0	19	2	10
Selenium	1.175	11.750	11.750	10.575		0		50	3			-----	0	0	-----	-----	10
Silver	1.175	11.750	11.750	10.575		0		62	3		0.00035	0.11	0	0	0.102	0.0104	10
Zinc	1.175	11.750	11.750	10.575	0.139	0		79	3		0.037	22	12.2	0	7	0.75	10
Organic Pollutants																	
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	10.575	0.0060	0		88.9	3			-----	0.53	0	-----	-----	10
Chloroform	1.175	11.750	11.750	10.575	0.0014	0		53.6	3			-----	0.12	0	-----	-----	10
Phenol	1.175	11.750	11.750	10.575	0.0000	0		92.7	3			-----	0.00	0	-----	-----	10
Other Pollutants																	
Oil and Grease	1.175	11.750	11.750	10.575		0			3			-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	10.575		0		98.21	3	0.5		-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM-WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D8. Local Limits Determination Based on Chronic State Water Quality Standards for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{POTW})	Stream Flow (mgd) (Q_{CSTR})	Upstream Conc. (mg/L) (C_{STR})	Chronic State WQS[a] (mg/L) (C_{CWQS})	Allowable Headworks (lb/day) (AHL_{CWQS})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{CWQS})	Industrial Local Limit (mg/L) ($C_{LIM-CWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	1.175	11.750	11.750	10.575	16.47	0		100	3.513	0.03		-----	1453	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.175	11.750	11.750	10.575	119.56	0		99.01	3.513	0		-----	10545	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.175	11.750	11.750	10.575	253.472	0			3.513			-----	22355	0	-----	-----	10
Phosphorus, Total (as P)	1.175	11.750	11.750	10.575	3.641	0		98.14	3.513	0.06		-----	321	0	-----	-----	10
Suspended Solids, Total (TSS)	1.175	11.750	11.750	10.575	128.29	0		99.33	3.513	12.38		-----	11315	0	-----	-----	10
Inorganic Pollutants																	
Antimony	1.175	11.750	11.750	10.575		0			3.513	0	0.64	81	0	0	73	7.48	10
Arsenic	1.175	11.750	11.750	10.575	0.0018	0		2.9	3.513	0	0.010	1.31	0.15	0	1.025	0.10	10
Cadmium	1.175	11.750	11.750	10.575		0		50	3.513	0	0.00010	0.025	0	0	0.022	0.00	10
Chromium III	1.175	11.750	11.750	10.575		0		72	3.513	0	0.028	13	0	0	11.329	1.1561	10
Chromium VI	1.175	11.750	11.750	10.575		0		72	3.513	0	0.011	5.20	0	0	4.68	0.48	10
Chromium, Total	1.175	11.750	11.750	10.575	0.0021	0		32.9	3.513	0		-----	0.18	0	-----	-----	10
Copper	1.175	11.750	11.750	10.575	0.0272	0		94.5	3.513	0	0.0029	6.604	2.4	0	3.54	0.3617	10
Cyanide	1.175	11.750	11.750	10.575		0		66	3.513	0	0.0052	1.9	0	0	1.752	0.179	10
Lead	1.175	11.750	11.750	10.575	0.001	0		74.52	3.513	0	0.0005	0.2722	0.1	0	0.15	0.02	10
Mercury	1.175	11.750	11.750	10.575		0		67	3.513	0	0.000014	0.005	0	0	0.0049	0.0005	10
Molybdenum	1.175	11.750	11.750	10.575		0		29	3.513	0		-----	0	0	-----	-----	10
Nickel	1.175	11.750	11.750	10.575	0.0025	0		18	3.513	0	0.016	2.506	0.22	0	2.039	0.21	10
Selenium	1.175	11.750	11.750	10.575		0		50	3.513	0	0.0050	1.273	0	0	1.15	0.117	10
Silver	1.175	11.750	11.750	10.575		0		62	3.513	0		-----	0	0	-----	-----	10
Zinc	1.175	11.750	11.750	10.575	0.139	0		79	3.513	0	0.037	22	12.2	0	8	0.81	10
Organic Pollutants																	
Bis(2-ethylhexyl)Phthalate	1.175	11.750	11.750	10.575	0.0060	0		88.9	3.513	0	0.0022	3	0.53	0	2	0.18	10
Chloroform	1.175	11.750	11.750	10.575	0.0014	0		53.6	3.513	0	0.47	129	0.12	0	116	11.83	10
Phenol	1.175	11.750	11.750	10.575	0.0000	0		92.7	3.513	0	0.30	523	0.002	0	471	48.04	10
Other Pollutants																	
Oil and Grease	1.175	11.750	11.750	10.575		0			3.513	0		-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.175	11.750	11.750	10.575		0		98.21	3.513	0.5		-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM-WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D9. Summary of Allowable Headworks Loadings (AHLs) for Fitzgerald Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority							
Pollutant	Allowable Headworks Loadings (lb/day)						
	Design Criteria 3/9/2020	NPDES Discharge Permit Limits (AHL_{NPDES})	Activated Sludge Treatment Inhibition (AHL_{SEC1})	Nitrification Treatment Inhibition (AHL_{SEC2})	Sludge Disposal (AHL_{SLUDGE})	Acute Water Quality Standards (AHL_{AWQS})	Chronic Water Quality Standards (AHL_{CWQS})
Conventional Pollutants							
Ammonia	7,448	28,367	47,038	-----	-----	-----	-----
Biochemical Oxygen Demand (BOD)	43,902	39,594	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	93,071.7	-----	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	1,567.9	737.6	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	42,236	292,522	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	81.47
Arsenic	-----	-----	9.800	146.99	580.802	43.08	1.311
Cadmium	-----	-----	634.1	599.5	16.432	0.128	0.025
Chromium III	-----	-----	2940	-----	57.057	254.6	12.588
Chromium VI	-----	-----	98.00	539.0	57.057	7.160	5.198
Chromium, Total	-----	-----	6779.11	144.31	124.867	-----	-----
Copper	-----	-----	125.63	33.29	652.081	8.483	6.604
Cyanide	-----	-----	342.3	56.38	-----	-----	1.947
Lead	-----	-----	581.1	113.95	55.128	6.751	0.272
Mercury	-----	-----	59.89	-----	2.453	0.614	0.0054
Molybdenum	-----	-----	-----	-----	106.244	-----	-----
Nickel	-----	-----	199.41	42.73	958.560	21.789	2.506
Selenium	-----	-----	-----	-----	16.432	-----	1.273
Silver	-----	-----	321.5	-----	66.260	0.113	-----
Zinc	-----	-----	389.3	38.93	1456.0	21.688	22.437
Organic Pollutants							
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	2.523
Chloroform	-----	-----	-----	1,139	91.973	-----	128.94
Phenol	-----	-----	13,315	426	-----	-----	523.11
Other Pollutants							
Oil and Grease	-----	-----	-----	-----	-----	-----	-----
Kjeldahl Nitrogen, Total (TKN)	10,387	-----	-----	-----	-----	-----	-----

Table D10. Summary of Allowable Industrial Loadings (AILs) for Fitzgerald Creek WPCF Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority							
Pollutant	Allowable Industrial Loadings (lb/day)						
	Design Criteria	NPDES Discharge Permit Limits	Activated Sludge Treatment Inhibition	Nitrification Treatment Inhibition	Sludge Disposal	Acute Water Quality Standards	Chronic Water Quality Standards
	3/9/2020	(AIL_{NPDES})	(AIL_{SEC1})	(AIL_{SEC2})	(AIL_{SLUDGE})	(AHL_{AWQS})	(AHL_{CWQS})
Conventional Pollutants							
Ammonia	5,250	24,077	40,881	-----	-----	-----	-----
Biochemical Oxygen Demand (BOD)	28,967	25,090	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	61,409	-----	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	1,090	343	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	26,697	251,955	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	73
Arsenic	-----	-----	8.67	132	522.568	39	1.025
Cadmium	-----	-----	570.7	540	14.789	0.12	0.02
Chromium III	-----	-----	2646	-----	51.35	229	11
Chromium VI	-----	-----	88.2	485.1	51.351	6.44	4.678
Chromium, Total	-----	-----	6101.0	129.7	112.199	-----	-----
Copper	-----	-----	110.7	27.6	584.5	5.24	3.54
Cyanide	-----	-----	308.08	50.7	-----	-----	1.8
Lead	-----	-----	522.93	102.5	49.52	6.0	0.15
Mercury	-----	-----	53.90	-----	2.207	0.6	0.005
Molybdenum	-----	-----	-----	-----	95.62	-----	-----
Nickel	-----	-----	179.3	38.2	862.5	19	2.04
Selenium	-----	-----	-----	-----	14.789	-----	1.1
Silver	-----	-----	289.4	-----	59.63	0.102	-----
Zinc	-----	-----	338	22.82	1,298.2	7	8
Organic Pollutants							
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	1.7
Chloroform	-----	-----	-----	1,025	82.65	-----	116
Phenol	-----	-----	11,983	383	-----	-----	471
Other Pollutants							
Oil and Grease	-----	-----	-----	-----	-----	-----	-----
Kjeldahl Nitrogen, Total (TKN)	9,349	-----	-----	-----	-----	-----	-----

Table D11. Maximum Allowable Headworks Loadings and Local Limits for Fitzgerald Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	Most Stringent Criterion	Maximum Allowable Headworks Loadings			Maximum Allowable Industrial Loadings			Local Limit Needed?	Calculated Industrial Local Limit (mg/L)	Worker Protection Screening Level[c] (mg/L)	Domestic/ Commercial Background Levels[d] (mg/L)	Final Industrial Local Limit[e] (mg/L)
		Calculated MAHL (lbs/day)	Current Influent Loading Based on Actual Flow[a] (lb/day)	Percent of MAHL Currently in Use[b] (%)	Calculated MAIL (lbs/day)	Current Industrial Loading Based on Actual Flow[a] (lb/day)	Percent of MAIL Currently in Use[b] (%)					
Conventional Pollutants												
Ammonia	Design Criteria	7,448	1,614	21.7%	5,250			Yes	536	-----		76
Biochemical Oxygen Demand (BOD)	Design Criteria	39,594	11,717	29.6%	25,090			Yes	2,560	-----		448
Chemical Oxygen Demand (COD)	Design Criteria	93,072	24,839	26.7%	61,409	3521	5.73%	Yes	6267	-----		950
Phosphorus, Total (as P)	Design Criteria	738	357	48.4%	343			Yes	35.0	-----		16
Suspended Solids, Total (TSS)	Design Criteria	42,236	12,572	29.8%	26,697	358	1.34%	Yes	2,724	-----		431
Inorganic Pollutants												
Antimony	Chronic State WQS	81.5	*0.02940*		73.3				7.48	-----		7.48
Arsenic	Chronic State WQS	1.31	0.17149	13.1%	1.03			Yes	0.105	-----		0.105
Cadmium	Chronic State WQS	0.025	0.00490	19.9%	0.022			Yes	0.002	-----		0.002
Chromium III	Chronic State WQS	12.6			11.3			Yes	1.16	-----		1.16
Chromium VI	Chronic State WQS	5.20	*0.48998*		4.68			Yes	0.477	-----		0.477
Chromium, Total	Sludge Disposal	125	0.201	0.16%	112				11.4	-----		11.4
Copper	Chronic State WQS	6.6	2.665	40.4%	3.54			Yes	0.362	-----		0.362
Cyanide	Chronic State WQS	1.95	1.22494	62.9%	1.75			Yes	0.179	-----		0.179
Lead	Chronic State WQS	0.272	0.103	37.8%	0.15			Yes	0.016	-----		0.016
Mercury	Chronic State WQS	0.005	0.0020	36.0%	0.005			Yes	0.0005	-----		0.0005
Molybdenum	Sludge Disposal	106			95.6				9.76	-----		9.76
Nickel	Chronic State WQS	2.51	0.24009	9.6%	2.04			Yes	0.208	-----		0.208
Selenium	Chronic State WQS	1.27	*0.08820*		1.15			Yes	0.117	-----		0.117
Silver	Acute State WQS	0.11	0.00980	8.68%	0.102			Yes	0.010	-----		0.010
Zinc	Acute State WQS	21.7	13.57	62.6%	7.3			Yes	0.75	-----		0.75
Organic Pollutants												
Bis(2-ethylhexyl)Phthalate	Chronic State WQS	2.5	*1.39398*	55.3%	1.7			Yes	0.18	-----		0.178
Chloroform	Sludge Disposal	92.0	*0.1372*	0.15%	82.7			Yes	8.43	-----		8.43
Phenol	Nitrification Treatment Inhibition	426	*1.9819*	0.47%	383				39.1	-----		39.1
Other Pollutants												
Oil and Grease	Chronic State WQS	1,089			980	51	5.2%	Yes	100	-----		100
Kjeldahl Nitrogen, Total (TKN)	Design Criteria	10,387	*4697.59543*	45.2%	9,349			Yes	954	-----		106

[a] Influent loadings are provided only for those parameters detected in influent samples.

[b] MAHL and MAIL utilizations are calculated only for those pollutants detected in the influent and industrial effluent, respectively.

[c] Worker Protection Screening Levels are the most stringent of discharge screening levels based on fume toxicity and explosivity. Refer to Table D6. Secondary source for worker protection screening level is provided in Table D7.

[d] Domestic/commercial background levels are provided only for those parameters with negative calculated local limits.

[e] Industrial local limits are the more stringent of the calculated industrial local limits and Worker Protection Screening Levels. In the case of negative local limits where domestic/commercial background levels are not available, the laboratory practical quantitation limit was used.

Industrial Pretreatment Local Limits Evaluation Rose Creek Water Pollution Control Plant

Prepared for

Cherokee County Water & Sewerage Authority
Canton, Georgia

March 9, 2020

Industrial Pretreatment Local Limits Evaluation
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March 9, 2020

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List of Abbreviations

AIL	allowable industrial loading
AHL	allowable headworks loading
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
CCWSA	Cherokee County Water & Sewerage Authority
CF	Conversion Factor
CFR	Code of Federal Regulations
cfs	cubic foot/feet per second
COD	chemical oxygen demand
d	day(s)
DO	dissolved oxygen
EPA	United States Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FOG	fats, oils, and greases
kg	kilogram(s)
lb	pound(s)
LLE	Local Limits Evaluation
MAIL	maximum allowable industrial loading
MAHL	maximum allowable headworks loading
MBAS	methylene blue active substances
mgd	million gallons per day
mg/L	milligram per liter
NPDES	National Pollutant Discharge Elimination System
POC	pollutant of concern
POTW	publicly owned treatment works
SGF	safety and growth factor
TCLP	toxicity characteristic leaching procedure
TDR	total dissolved residue
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TPH	total petroleum hydrocarbons
TRC	total residual chlorine
TSS	total suspended solids
TTO	total toxic organics
USGS	United States Geological Survey
UV	ultraviolet
WQS	water quality standards
WPCP	water pollution control plant

List of Variables

1Q10	lowest average flow for a 1-day period that is expected to occur once every 10 years
7Q10	lowest average flow for a 7-day period that is expected to occur once every 10 years
AHL_{DESIGN}	AHL based on WPCP design criteria, lb/d
AHL_{NPDES}	AHL based on NPDES permit limit for effluent discharge, lb/d
AHL_{SEC}	AHL based on inhibition of secondary treatment processes, lb/d
AHL_{TER}	AHL based on inhibition of tertiary treatment processes, lb/d
AHL_{WQS}	AHL based on water quality standards, lb/d
AIL_{IU}	allowable industrial loading, lb/d
C_{DOM}	domestic and commercial background levels, mg/L
C_{HW}	concentrations in septic/hauled waste, mg/L
C_{INHIB2}	inhibition criterion for secondary treatment, mg/L
C_{INHIB3}	inhibition criterion for tertiary treatment, mg/L
C_{LIM}	uniform concentration-based local limit, mg/L
C_{NPDES}	NPDES permit limit for effluent discharge, mg/L
C_{STR}	receiving stream background concentration, mg/L
C_{WQS}	in-stream state water quality standard, mg/L
CF	conversion factor to convert dissolved to total metals fraction, unitless
DC	WPCP design criteria, mg/L
E_{WPCP}	WPCP effluent pollutant concentration, mg/L
I_r	WPCP influent pollutant concentration at headworks, mg/L
$L_{\%}$	percentage of MAHL currently utilized, percent
L_{INFL}	current influent loading (average or daily maximum), lb/d
L_{UNC}	loadings from uncontrolled sources, lb/d
PL	pollutant loading, lb/d
Q_{DOM}	domestic and commercial flow, mgd
Q_{HW}	septic and hauled waste flow, mgd
Q_{IND}	industrial flow, mgd
Q_{IU}	flow from an industrial user, mgd
Q_{NPDES}	NPDES permitted flow for effluent discharge, mgd
Q_{STR}	receiving stream (upstream) flow rate, mgd
Q_{WPCP}	WPCP average effluent flow rate, mgd
R_{PRIM}	removal efficiency from headworks to primary effluent, decimal
R_{SEC}	removal efficiency from headworks to secondary effluent, decimal
R_{WWT}	plant removal efficiency from headworks to effluent, decimal
WQS_{DISS}	WQS for the dissolved fraction, µg/L
WQS_{TOTAL}	WQS for the total recoverable fraction, µg/L

Executive Summary

Brown and Caldwell (BC) conducted a Local Limits Evaluation (LLE) in accordance with Georgia Environmental Protection Division (EPD) and the United Stated Environmental Protection Agency (EPA) for Cherokee County Water & Sewer Authority (CCWSA). This report provides guidance for the development of local limits on discharges to Cherokee County's (the County) water pollution control plant (WPCP) that receives industrial wastewater, Rose Creek WPCP. In the past, County-wide local limits were developed based on the more stringent of the recommended industrial limits for Rose Creek WPCP and Fitzgerald Creek WPCP. For this LLE, local limits were calculated separately for the two plants to provide more flexibility and because the potential for industrial growth will likely occur in the area served by the Rose Creek WPCP.

In 2018, Brown and Caldwell was contracted by CCWSA to complete LLEs. This report addresses the development of local limits on industrial discharges to the Rose Creek WPCP. Important findings noted during the evaluation and recommendations for future reviews and re-evaluations are also provided.

Applied Methodology and Approach

This LLE was prepared in accordance with EPD and EPA requirements. Details on the applied methodology, assumptions, and approach used during development of the proposed new local limits for the Rose Creek WPCP are described below.

- The industrial local limits for pollutants of concern (POCs) were derived based on the following criteria:
  - Revised NPDES limits
  - EPA POC
  - Protection of receiving stream water quality due to pass-through
  - Recent detections in the influent, effluent, or industrial wastewaters
  - Updated Water Quality Standards (WQS) and sludge disposal criteria
  - Prevention of treatment plant performance problems due to process interference or inhibition
  - Prevention of hazardous sludge disposal.
- Site-specific removal efficiencies were calculated for the conventional pollutants based on Rose Creek averages of influent and effluent analytical results data from the period of November 2017 through October 2018. In addition, removal efficiencies were calculated for those non-conventional POCs detected in the influent and/or effluent samples during the same time frame. Literature values were used for POCs with no available site-specific removal efficiencies.
- Literature values were used where site-specific domestic/commercial concentrations of POCs in wastewater were not available. Background levels were assumed to be negligible when domestic/commercial levels were not available.
- Allowable headworks loadings were calculated based on the design criteria, NPDES permit limits, activated sludge and nitrification treatment inhibition, sludge disposal standards, and acute and chronic WQS.

- All inhibition thresholds were based on literature values with the median threshold value, or minimum when there was no median, to provide a conservative limit.
- Currently, sludge from the Rose Creek WPCP is land applied. CCWSA has requested and the EPA recommends the WPCP develop local limits to ensure the sludge meets "clean sludge" requirements [40 Code of Federal Regulations (CFR) 503.13]. The criteria used in calculations was the more stringent between the ceiling concentrations, cumulative pollutant loading rates, monthly average pollutant concentrations, and landfill disposal toxicity characteristic leaching procedure regulatory level.
- Georgia acute and chronic WQS are from EPD *Rules and Regulations for Water Quality Control* (Chapter 391-3-6-03). Standards that are hardness-dependent were first adjusted for hardness of the receiving stream and dissolved metals were then converted to total recoverable. The most stringent acute and chronic water quality standard for each parameter was used. Per EPA *Local Limits Development Guidance*, a hardness level of 25 milligrams per liter (mg/L) was assumed.
- The average effluent flow of 10 million gallons per day (mgd) was based on requested flow from CCWSA. The average industrial flow of 1 mgd was based on 10 percent of the average effluent flow. The septage/hauled flow was estimated to be 0.004 mgd based on current and anticipated flow at Rose Creek WPCP. The average dry sludge to disposal of 341,395 pounds per day (lb/d) was based a 65 percent increase in effluent flow.
- The facility is currently authorized to discharge a monthly average of 6.0 mgd and a future expansion to 10 mgd of advanced treated effluent to Etowah River Arm to Lake Allatoona under NPDES Permit GA0046451 issued by EPD. This permit became effective as of April 1, 2015 and expires on March 31, 2020. The Etowah River Arm of Lake Allatoona, located in the Coosa River basin, has a fishing designation and is the receiving water for effluent from the Rose Creek WPCP.
- Upstream water quality data was provided by CCWSA since there are no United States Geological Survey (USGS) stations located on Little River Arm of Lake Allatoona upstream of the WPCP. Detected concentrations were averaged to provide a background concentration per parameter. Where data were not available or parameters were not detected, the upstream concentration was assumed to be negligible.
- A safety factor of 10 percent was used to adequately address data uncertainties in this LLE.

The following presents the important findings noted during the evaluation and also provides recommendations for future reviews and re-evaluations.

Important Findings of the LLE

The major findings of this LLE are listed below.

- Per EPA guidance, the average flow should be used in calculating local limits, which is currently 3.45 mgd. However, to anticipate growth and provide stricter limits, an average flow of 10 mgd was used in the calculations. In addition, industrial users are assumed to contribute 1 mgd (10 percent of the flow).
- The proposed local limits use the background stream concentrations to account for upstream sources of pollutants.
- In calculating the proposed local limits, stream hardness upstream of WPCP was assumed to be 25 mg/L per Chapter 3 of the EPA Water Quality Standards Handbook; therefore, WQS were adjusted accordingly.
- The current local limits used a 10 percent safety factor.

- The proposed local limits consist of 22 parameters as the current limits.
- The proposed local limits for conventional pollutants were defaulted to design criteria to incorporate a more conservative local limit.

Recommendation for Future Review and Re-evaluations

Recommendations for future reviews and re-evaluations of local limits are as follows:

- Local limits should be reevaluated in the event of major changes that may affect local limits. These changes include, but are not limited to:
  - Revised NPDES limits
  - Changes associated with industrial users; for example, the addition of a new major industry
  - Significant domestic and/or commercial growth in the County
  - Additions or improvements of treatment processes occurring at the WPCPs
  - The revision of state and/or national water quality criteria
  - Changes in sludge disposal methods
  - Changes in the Industrial Pretreatment Program.

Section 1

Introduction

Cherokee County Water and Sewer Authority (CCWSA) operates the Rose Creek WPCP that will serve Cherokee County. Rose Creek WPCP is currently permitted for a flow of 6 mgd on a monthly maximum basis. Because of changes in regulatory-driven permits and Water Quality Standards (WQS), Pollutants of Concern (POCs) and local limits were re-evaluated to meet regulatory requirements, to help protect wastewater systems, personnel, and the environment, and to help maintain sludge quality.

Rose Creek WPCP was re-issued a National Pollutant Discharge Elimination System (NPDES) Permit by the Georgia Environmental Protection Division (EPD) on April 1, 2015. In accordance with Part III.A.2.c of the permit, adopted local limits must be revised to help ensure that they continue to prevent interference with the operation of the WPCP, prevent pass-through of pollutants in violation of the NPDES permit, prevent municipal sludge contamination, and prevent toxicity to life in the receiving stream.

This Local Limits Evaluation (LLE) is a technical and detailed evaluation of the local limits developed for the Rose Creek WPCP.

1.1 Project Objective

The objective of this effort was to updated industrial local limits for the Rose Creek WPCP to enforce the specific and general prohibitions as well as state and local regulations, address site-specific concerns, and provide WPCP protection limits. The specific and general prohibitions along with categorical standards are designed to provide a minimum acceptable level of control over industrial user discharges. Local limits are established to provide additional control to prevent site-specific and environmental problems due to non-domestic discharges. Therefore, this LLE used site-specific data to identify POCs that may be expected to be discharged in quantities sufficient to cause plant or environmental problems. Some of the factors considered in developing local limits included:

- Efficiency of the WPCP in treating wastes
- Compliance with NPDES permit limits
- Condition of the water body that receives treated effluent
- State and/or federal WQS that are applicable to the water body receiving treated effluent
- Retention, use, and disposal of sewage sludge
- Worker health and safety concerns.

This LLE provides documentation and reasoned guidance on the following:

- Determining POCs
- Gathering and analyzing data
- Calculating allowable headworks loadings (AHLs) for each POC based on applicable criteria
- Determining maximum allowable headworks loadings (MAHLs) and maximum allowable industrial loadings (MAILs) for each POC, and converting these loadings to local limits

- Comparing industrial loadings to MAILs to ensure that local limits meet the needs of the industries to the extent possible.

1.2 Organization of Report

This LLE report is organized into seven sections as follows:

- **Section 1** is an introduction to the LLE and describes the project objectives.
- **Section 2** describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the LLE.
- **Section 3** provides details regarding the development of local limits for Rose Creek WPCP.
- **Section 4** lists the industrial allocations.
- **Section 5** lists the final proposed local limits.
- **Section 6** provides the limitations.
- **Section 7** lists the references.

A large volume of data and calculations was utilized to complete the LLE for CCWSA, including site-specific data, literature values, and calculation spreadsheets. The tables and appendices of this LLE contain the information needed to reproduce the local limits except for the raw analytical data, which are summarized in tables. Analytical data can be made available upon request.

The following data and calculation spreadsheets can be found in the appendices to this LLE:

- **Appendix A** contains site-specific data for Rose Creek WPCP used to develop the local limits. Included in this appendix are the following:
  - Monthly average estimations for the influent and effluent flows (Table A1)
  - Monthly estimations of volumes of sludge to disposal from Rose Creek WPCP (Table A1)
  - Concentrations of conventional pollutants in influent and effluent samples collected from November 2017 through October 2018 averaging from Rose Creek WPCP (Table A2)
  - Concentrations of metals in influent and effluent samples collected between November 2017 through October 2018 averaging from Rose Creek WPCP (Table A3)
  - Concentrations of organics in influent and effluent samples collected between November 2017 through October 2018 averaging from Rose Creek WPCP (Table A4)
  - Removal efficiencies calculated for conventional pollutants, metals, and organics based on average influent and effluent concentrations from Rose Creek WPCP (Tables A2 through A4)
  - Upstream background concentrations of conventional and inorganic pollutants from the Etowah River, Georgia (Table A5).
- **Appendix B** contains the literature data used in the LLE when site-specific data were not available. Included in this appendix are the following:
  - Removal efficiencies for priority pollutants, including overall treatment plant removal efficiencies as well as removal efficiencies through primary, secondary, and tertiary treatment processes (Tables B1 through B4)
  - Treatment inhibition threshold levels for activated sludge and nitrification treatment (Tables B5 and B6)
  - Domestic and commercial pollutant loadings (Table B7).

- **Appendix C** contains the regulatory limits and/or criteria applicable to Rose Creek WPCP, including the following:
  - Design-based wastewater treatment plant capacity criteria (Table C1)
  - NPDES permit limits (Table C2)
  - Biosolids land application regulatory limits (Table C3)
  - WQS for Rose Creek WPCP (Tables C4 and C5)
  - Worker protection screening levels based on fume toxicity and explosivity (Tables C6 and C7).
- **Appendix D** contains the calculation worksheets used to calculate all allowable headworks loadings, allowable industrial loadings, and local limits for Rose Creek WPCP including the following:
  - Allowable headworks and industrial loadings based on design criteria, NPDES permit, activated sludge and nitrification inhibition threshold levels, sludge disposal, and acute and chronic WQS (Tables D1 through D8)
  - Summary of allowable headworks and industrial loadings (Tables D9 and D10)
  - Maximum allowable headworks loadings and local limits (Table D11).

Section 2

Pollutants of Concern: Screening and General Methodologies

This section describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the evaluation.

2.1 Screening for Pollutants of Concern

A POC is any pollutant that may be expected to be discharged to a WPCP in sufficient amounts to cause pass-through or interference or present risk to workers. Pollutants that are contributing to or known to cause operational problems (i.e., inhibition of a treatment process) are also considered POCs even if the pollutants are not currently causing permit violations. The United States Environmental Protection Agency (EPA) has identified 15 pollutants often found in WPCP sludge and effluent that it considers potential POCs. These include arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, zinc, molybdenum, selenium, 5-day biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia as nitrogen (for plants that accept non-domestic sources of ammonia). Additional POCs listed in Table 2-1 were identified using applicable EPA screening criteria contained in the EPA *Local Limits Development Guidance Manual* (EPA 2004):

- **NPDES permit limits:** These permit conditions establish the objectives that the WPCP must meet to prevent pass-through and interferences. The WPCP is required to prohibit discharge from industrial users in amounts that result in or cause a violation of any requirement of the WPCP's NPDES permit.
- **Water quality criteria:** Water quality criteria have been developed by EPA and/or EPD for protection of surface water, including the receiving waters for permitted dischargers. The WPCP does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion. However, EPA recommends that any pollutant that has a reasonable potential to be discharged in amounts that could exceed WQS or criteria should be considered a POC and evaluated accordingly.
- **Sludge quality standards:** WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. Currently, the Rose Creek WPCP hauls sludge to a local landfill. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements [40 Code of Federal Regulations (CFR) 503.13].
- **Prohibition on treatment plant interference:** The General Pretreatment Regulations prohibit any user of a WPCP from discharging pollutants that cause interference (i.e., a discharge that inhibits or disrupts a WPCP resulting in a violation of the WPCP's NPDES permit or noncompliance with the WPCP's sewage sludge requirements). EPA recommends that the WPCP consider pollutants that have previously interfered with or may potentially interfere with the treatment works' operation to be a potential POC.

- **Influent, effluent, and sludge scans at the WPCP:** EPA recommends that the WPCP conduct additional screening for any pollutant found in the priority pollutant scans of its influent, effluent, or sludge to determine whether the pollutant should be listed as a POC. Although a pollutant found in this way is a potential POC, the WPCP may determine based on the pollutant's concentration that the pollutant need not be selected as a POC for which local limits are developed.
- **Industrial discharge scans:** An additional screening was conducted to identify pollutants detected in the industrial users' discharge. Although a pollutant found in this way is a potential POC, the WPCP may determine, based on the pollutant's concentration, that the pollutant need not be selected as a POC for which local limits are developed.

In general, EPA recommends that an LLE be conducted for EPA's 15 POCs, as well as any pollutant for which the WPCP has a preexisting local limit or an applicable NPDES limit or sludge disposal limit, or that has caused inhibition or other problems in the past.

2.1.1 Pollutants of Concern

Table 2-1 provides the parameters and criteria used for this screening and identifies those pollutants for which local limits are needed based on the screening for Rose Creek WPCP.

In addition to EPA's 15 POCs, based on the above guidelines, 5 additional parameters were identified as POCs for Rose Creek WPCP. Additionally, the pollutants oil and grease and total Kjeldahl nitrogen (TKN) were also included in the evaluation.

2.2 General Methodologies

This section presents the methodology used to calculate MAHLs. A MAHL is an estimate of the upper limit of pollutant loading to a WPCP intended to prevent pass-through or interference. Methodologies for calculating MAHLs are well established in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be broken down into a three-step procedure: (1) calculation of removal efficiencies, (2) calculation of AHLs for each environmental criterion, and (3) designation of the most stringent AHL as the MAHL for each POC.

2.2.1 Calculation of Removal Efficiencies

Removal efficiency is the fraction or percentage of the influent pollutant loading that is removed from the waste stream across an entire wastewater treatment works (plant removal efficiency) or through specific wastewater treatment processes within the works (primary, secondary, and/or tertiary removal efficiencies). Removal efficiencies are based largely on site-specific conditions such as climate, WPCP design, operation and maintenance, plant conditions, and sewage characteristics.

EPA recommends that site-specific data be used to calculate removal efficiencies. Since Rose Creek WPCP is an existing treatment plant, average plant removal efficiencies were calculated from the Rose Creek WPCP available influent and effluent data from November 2017 through October 2018, as presented in Tables A2 through A4 in Appendix A.

The proposed removal efficiencies reported by other WPCPs by studies that have been published in professional journals or by EPA were used in developing local limits. These literature-based data are presented in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be found in Appendix B. Those POCs with data available to calculate site-specific removal efficiencies are discussed in further detail in Section 3.

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Conventional Pollutants											
Ammonia	Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	YES
Biochemical Oxygen Demand (BOD)	Yes	Yes	No	Yes	Yes	No	No	No	No	No	YES
Chemical Oxygen Demand (COD)	No	Yes	Yes	No	Yes	Yes	No	No	No	No	YES
Phosphorus, Total (as P)	No	Yes	No	Yes	Yes	No	No	No	No	No	YES
Suspended Solids, Total (TSS)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	YES
Inorganic Pollutants											
Antimony	No	No	No	No	No	No	Yes	No	No	No	
Arsenic	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Barium	No	No	No	No	No	No	No	No	No	Yes	
Cadmium	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Chromium III	No	No	No	No	Yes	No	Yes	Yes	No	No	YES
Chromium VI	No	Yes	No	No	Yes	No	Yes	Yes	No	No	YES
Chromium, Total	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes	YES
Copper	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Cyanide	Yes	No	No	No	Yes	No	Yes	Yes	No	No	YES
Lead	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Mercury	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Molybdenum	Yes	No	No	No	No	No	No	No	No	No	YES
Nickel	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Selenium	Yes	Yes	No	No	Yes	No	Yes	No	No	Yes	YES
Silver	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES
Thallium	No	No	No	No	No	No	Yes	No	No	No	
Vanadium	No	No	No	No	No	No	No	No	No	No	
Zinc	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	YES

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Organic Pollutants											
Acenaphthene	No	No	No	No	No	No	Yes	No	No	No	
Acenaphthene	No	No	No	No	No	No	No	No	No	No	
Acetone	No	No	No	No	No	No	Yes	No	Yes	No	
Acrolein	No	No	No	No	No	No	Yes	No	Yes	No	
Acrylonitrile	No	No	No	No	No	No	Yes	No	Yes	No	
Aldrin	No	No	No	No	No	No	Yes	Yes	No	No	
Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Aroclor 1232	No	No	No	No	No	No	Yes	No	Yes	No	
Aroclor 1242	No	No	No	No	No	No	Yes	No	Yes	No	
Aroclor 1254	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Benzene	No	No	No	No	No	No	Yes	No	No	No	
Benzidine	No	No	No	No	No	No	Yes	No	No	No	
Benzo(a)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(a)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(k)Fluoroethene	No	No	No	No	No	No	Yes	No	No	No	
Benzofluoranthene, 3,4-	No	No	No	No	No	No	Yes	No	No	No	
BHC-Alpha, a-	No	No	No	No	No	No	Yes	No	No	No	
BHC-Beta, b-	No	No	No	No	No	No	No	No	No	No	
BHC-Delta, d-	No	No	No	No	No	No	Yes	No	No	No	
Bis(2-chloroethyl)Ether	No	No	No	No	No	No	Yes	No	No	No	
Bis(2-chloroisopropyl)Ether	No	No	No	No	No	No	No	No	Yes	No	
Bis(2-chloromethyl)Ether	No	Yes	No	No	Yes	No	Yes	No	No	No	
Bis(2-ethylhexyl)Phthalate	No	Yes	No	No	No	No	No	No	No	No	YES
Bromodichloromethane	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Bromoform	No	No	No	No	No	No	Yes	No	Yes	No	
Butylbenzyl Phthalate	No	No	No	No	No	No	Yes	No	No	No	
Carbon Disulfide	No	No	No	No	No	No	No	No	Yes	No	
Carbon Tetrachloride	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane, Gamma	No	No	No	No	No	No	No	No	No	No	
Chlorobenzene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlorodibromomethane	No	No	No	No	No	No	Yes	No	No	No	
Chloroethane	No	No	No	No	No	No	No	No	Yes	No	
Chloroform	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	YES
Chloronaphthalene, 2-	No	No	No	No	No	No	Yes	No	No	No	
Chlorophenol, 2-	No	No	No	No	No	No	Yes	Yes	No	No	
Chrysene	No	No	No	No	No	No	Yes	No	No	No	
DDD, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDE, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDT, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
Dibenzo(a,h)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Dibromochloromethane	No	No	No	No	No	No	No	No	No	No	
Dichlorobenzene, 1,1-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Dichlorobenzene, 1,2-	No	No	No	No	No	No	Yes	Yes	No	No	
Dichlorobenzene, 1,3-	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	
Dichlorobenzene, 1,4-	No	No	No	No	No	No	Yes	No	No	No	
Dichlorobenzidine, 3,3-	No	No	No	No	No	No	Yes	No	No	No	
Dichlorobromomethane	No	No	No	No	No	No	No	No	Yes	No	
Dichlorodifluoromethane	No	No	No	No	No	No	Yes	No	Yes	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Dichlorofluoromethane	No	No	No	No	No	No	No	No	No	No	
Dichloroethane, 1,1-	No	No	No	No	No	No	No	No	Yes	No	
Dichloroethane, 1,2-	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Dichloroethylene, 1,1-	No	No	No	No	No	No	Yes	No	Yes	Yes	
Dichloroethylene, cis-1,2-	No	No	No	No	No	No	No	No	No	No	
Dichloroethylene, trans-1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichlorophenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Dichloropropane, 1,2-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Dichloropropane, 1,3-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichloropropylene, 1,3-	No	No	No	No	No	No	No	No	No	No	
Dieldrin	No	No	No	No	No	No	Yes	No	Yes	No	
Diethyl phthalate	No	No	No	No	No	No	Yes	No	Yes	No	
Dimethyl phthalate	No	No	No	No	No	No	Yes	No	No	No	
Dimethylphenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Di-n-butyl phthalate	No	No	No	No	No	No	Yes	No	No	No	
Dinitro-o-cresol, 4,6-	No	No	No	No	No	No	No	No	Yes	No	
Dinitrophenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Dinitrophenol, 2-Methyl-4,6-	No	No	No	No	No	No	Yes	No	No	No	
Dinitrotoluene, 2,4-	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Diphenylhydrazine, 1,2-	No	No	No	No	No	No	Yes	Yes	No	No	
Endosulfan Sulfate	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, alpha-	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, beta-	No	No	No	No	No	No	Yes	No	No	No	
Endrin	No	No	No	No	No	No	Yes	No	Yes	Yes	
Endrin Aldehyde	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Ethylbenzene	No	No	No	No	No	No	Yes	Yes	Yes	No	
Fluoranthene	No	No	No	No	No	No	Yes	No	No	No	
Fluorene	No	No	No	No	No	No	Yes	No	No	No	
Formaldehyde	No	No	No	No	No	No	No	No	Yes	No	
Heptachlor	No	No	No	No	No	No	Yes	No	Yes	Yes	
Heptachlor Epoxide	No	No	No	No	No	No	Yes	No	No	Yes	
Hexachlorobenzene	No	No	No	No	No	No	Yes	Yes	No	Yes	
Hexachlorobutadiene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Hexachlorocyclopentadiene	No	No	No	No	No	No	Yes	No	Yes	No	
Hexachloroethane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Indeno(1,2,3-cd)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Isophorone	No	No	No	No	No	No	Yes	No	No	No	
Isopropyltoluene, p-	No	No	No	No	No	No	No	No	No	No	
Lindane	No	No	No	No	No	No	Yes	No	No	Yes	
Methyl Bromide (Bromomethane)	No	No	No	No	No	No	Yes	No	Yes	No	
Methyl Chloride (Chloromethane)	No	No	No	No	No	No	No	No	Yes	No	
Methyl ethyl ketone (2-Butanone)	No	No	No	No	No	No	No	No	Yes	Yes	
Methyl tert-butyl ether	No	No	No	No	No	No	No	No	No	No	
Methylene blue active substances (MBAS)	No	No	No	No	No	No	No	No	No	No	
Methylene chloride	No	No	No	No	No	No	Yes	No	Yes	No	
Methoxychlor	No	No	No	No	No	No	Yes	No	No	Yes	
Naphthalene	No	No	No	No	No	No	No	Yes	Yes	No	
Nitrobenzene	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
N-Nitrosodimethylamine	No	No	No	No	No	No	Yes	No	No	No	
N-Nitrosodiphenylamine	No	No	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Nonylphenol	No	No	No	No	No	No	No	No	No	No	
PCBs	No	No	No	No	No	No	Yes	No	No	No	
Pentachlorophenol	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Phthalate, Di-n-octyl	No	No	No	No	No	No	No	No	No	No	
Phenanthrene	No	No	No	No	No	No	No	Yes	No	No	
Phenol	No	No	No	No	No	No	Yes	Yes	Yes	No	
Phenolics, Total Recoverable	No	No	No	No	No	No	No	No	No	No	
Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Silvex (2,4,5-TP)	No	No	No	No	No	No	Yes	No	No	Yes	
Tetrachloroethane, 1,1,2,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Tetrachloroethylene	No	No	No	No	No	No	Yes	Yes	Yes	No	
Toluene	No	Yes	No	No	No	No	Yes	Yes	Yes	No	
Toxaphene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Trichlorobenzene, 1,2,4-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethane, 1,1,1-	No	No	No	No	No	No	No	No	Yes	No	
Trichloroethane, 1,1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethylene	No	No	No	No	No	No	No	No	No	Yes	
Trichlorofluoromethane	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Trichlorophenol, 2,4,6-	No	No	No	No	No	No	No	No	Yes	No	
Vinyl Chloride	No	No	No	No	No	No	Yes	No	No	Yes	
Xylenes, Total	No	No	No	No	No	No	Yes	No	Yes	Yes	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter an EPA POC?	Is the parameter detected in influent/ effluent/sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing NPDES permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Other Pollutants											
Oil & Grease	No	Yes	Yes	No	Yes	Yes	No	No	No	No	YES
Total Dissolved Residue (TDR)	No	No	No	No	No	No	No	No	No	No	
Total Dissolved Solids (TDS)	No	No	No	No	No	No	No	No	No	No	
Total Petroleum Hydrocarbons (TPH)	No	No	No	No	No	No	No	No	No	No	
Total Toxic Organics (TTO)	No	No	No	No	No	No	No	No	No	No	
Sulfide	No	No	No	No	No	No	No	Yes	No	No	
Iodine	No	No	No	No	No	No	No	Yes	No	No	
Surfactants	No	No	No	No	No	No	No	Yes	No	No	
Sodium	No	No	No	No	No	No	No	No	No	No	
Chloride	No	No	No	No	No	No	No	Yes	No	No	
Hydrogen sulfide	No	No	No	No	No	No	No	No	Yes	No	
Total Residual Chlorine (TRC)	No	No	No	No	No	No	No	No	No	No	
Ortho-Phosphorus	No	No	No	Report	No	No	No	No	No	No	
Organic Nitrogen	No	No	No	Report	No	No	No	No	No	No	
Nitrate-Nitrite as N	No	No	No	Report	No	No	No	No	No	No	
Kjeldahl Nitrogen, Total (TKN)	No	Yes	No	Report	No	No	No	No	No	No	YES

2.2.2 Calculation of Allowable Headworks Loadings

In this step, an AHL is calculated for each applicable criterion: WPCP design criteria, NPDES permit limits, state WQS, and the various forms of interference that can occur through the treatment processes. Equations for calculating AHLs are based on a concentration-based and mass-based approach. Equations are presented and described in Section 3. Once WPCP and POC-specific AHLs are calculated for each of the applicable criteria, the lowest, or most stringent, of the AHLs is chosen as the MAHL. This helps ensure that the resulting local limits are protective of each environmental criterion considered in the development of local limits.

2.2.3 Determination of Maximum Allowable Industrial Loadings and Local Limits

Once MAHLs are identified, they are used to calculate the MAILs and the concentration-based industrial local limits. The concentration-based industrial local limits are compared to screening levels protective of the WPCP workers, and the more stringent values are selected as the final local limits. Several methods are commonly used to allocate local limits to industrial users, including uniform industrial local limits, flow- or mass-based limits, and other limits developed on a case-by-case basis. Based on the needs of Rose Creek WPCP, CCWSA has chosen to implement concentration-based limits for each WPCP.

Section 3

Rose Creek: Local Limits Development

The primary objective of this section is to describe the methodologies used to develop local limits for Rose Creek WPCP. Included in this section are descriptions of AHL calculations based on various environmental criteria, including:

- Design criteria
- NPDES permits
- State acute and chronic WQS
- Activated sludge treatment inhibition
- Nitrification treatment inhibition
- Sludge disposal regulations.

Also included in this section are references to data sources used for calculating AHLs and the rationale for assumptions. Results of AHL calculations, determinations of the MAHLs, and calculations for MAILs and industrial local limits are also provided.

3.1 Introduction

The Rose Creek WPCP is located in the south part of the County at 1957 Authority Drive in Woodstock, Georgia (Figure 3-1) within the Towne Lake development. The receiving water of effluent from Rose Creek WPCP is the Etowah arm of Lake Allatoona in the Coosa River Basin.

Figure 3-1. Aerial Photograph of the Rose Creek WPCP (March 2019)

3.1.1 NPDES Permit

The facility is authorized to initially discharge a monthly average of 6 mgd with future expansion to 10 mgd of advanced treated effluent to the Etowah River under NPDES Permit GA0046451 issued by EPD (refer to Appendix C, Table C2 for NPDES permit discharge limitations). This permit became effective as of April 1, 2015 and expires on March 31, 2020. The Etowah River, located in the Coosa River basin, has a fishing designation and is the receiving water for effluent from the Rose Creek WPCP.

3.1.2 Treatment Processes

The Rose Creek WPCP is a tertiary wastewater treatment facility which produces high quality effluent. The WPCP receives influent wastewater from the Little River Pumping Station, Wyngate subdivision gravity sewer line, a 48-inch gravity sewer line, and septage from an on-site septage receiving station. The influent sampler is located upstream of the bar screens and includes all flows, including screened septage, to the WPCP. Upon entering the facility, wastewater flows by gravity through a mechanically-cleaned bar screen that removes objects greater than one inch. After coarse screening, the influent wastewater enters the raw sewage pumping station where it is pumped to the subsequent unit processes. The wastewater is pumped to a fine screen that removes solids that are greater than ¼-inch, and then the wastewater flows to the sequencing batch reactors (SBR) for biological treatment.

The secondary process at the Rose Creek WPCP comprises activated sludge using four SBR reactors manufactured by Aqua Aerobics that are operated in parallel. Each SBR is operated as a fill and draw process. Screened wastewater enters the SBR during the fill period, is then aerated, and subsequently allowed to settle before the secondary effluent (supernatant) is decanted. After biological treatment, effluent from the SBRs flows to an equalization basin before flowing by gravity at a constant rate to downstream process units. The flow rate is controlled by a venturi flow control device.

Secondary effluent from the SBRs flows from the effluent equalization basin to the tertiary clarifiers. Poly-aluminum chloride is added to the tertiary clarifier influent to promote chemical phosphorus removal. Effluent from the tertiary clarifiers flows by gravity to the traveling bridge sand filters for final polishing before flowing to chlorine contact basins for disinfection and subsequent de-chlorination. Effluent is pumped through approximately 20,700 feet of force main to an underwater diffuser in the Etowah arm of Lake Allatoona.

Un-thickened waste activated sludge (WAS) from the SBRs and sludge from the tertiary clarifiers is pumped to aerobic digesters for sludge stabilization and thickening, followed by belt press dewatering prior to final disposal. The following sections describe the development of AHLs based on the various criteria. Calculation spreadsheets used to develop AHLs and local limits are included in Appendix E1. A summary of AHLs developed for Rose Creek WPCP can be found in Table 3-1.

3.2 Site-Specific Flows and Removal Efficiencies

Average flow rates and plant removal efficiencies are used to calculate AHLs for all criteria. Influent, effluent, and sludge flows for the Rose Creek WPCP are summarized in Appendix A, Table A1. Currently, the monthly average flow and permitted flow for the Rose Creek WPCP is 3.45 mgd and 6 mgd, respectively; however, an average effluent flow of 10 mgd and permitted flow of 10 mgd was used for the calculations to anticipate growth.

Influent and effluent concentrations of conventional pollutants from Rose Creek WPCP, including ammonia, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total phosphorus, Total Kjeldahl Nitrogen (TKN), and TSS, from November 2017 through October 2018 are summarized in Appendix A, Table A2. For non-conventional pollutants, two priority pollutant influent and effluent data sets were averaged between August 2017 and July 2018 for use in this evaluation from Rose Creek

WPCP, and detections are presented in Appendix A, Tables A3 and A4. Site-specific removal efficiencies, R_{WPCP}, were calculated for the following POCs using average influent and effluent pollutant concentrations (Appendix A, Tables A2 through A4). Since only two data packages were provided for non-conventional pollutants, literature values were used in cases of negative percent removals.

- **Ammonia**: A plant removal efficiency of 99.24 percent was calculated using average influent and effluent concentrations of 33.3 mg/L and 0.3 mg/L, respectively.
- **BOD**: A plant removal efficiency of 99.07 percent was calculated using average influent and effluent concentrations of 297 mg/L and 2.8 mg/L, respectively.
- **Phosphorus, total**: A plant removal efficiency of 97.45 percent was calculated using average influent and effluent concentrations of 7.21 mg/L and 0.18 mg/L, respectively.
- **TKN**: A plant removal efficiency of 98.11 percent was calculated using average influent and effluent concentrations of 43 mg/L and 0.8 mg/L, respectively.
- **TSS**: A plant removal efficiency of 99.44 percent was calculated using average influent and effluent concentrations of 325 mg/L and 1.8 mg/L, respectively.
- **Arsenic**: A plant removal efficiency of 20.69 percent was calculated using an influent concentration of 0.0007 mg/L and an average effluent concentration of 0.0006 mg/L.
- **Chromium**: A plant removal efficiency of 81.13 percent was calculated using an influent concentration of 0.00133 mg/L and an average effluent concentration of 0.0003 mg/L.
- **Hexavalent Chromium**: A plant removal efficiency of 61.54 percent was calculated using an influent concentration of 0.013 mg/L and an average effluent concentration of 0.005 mg/L.
- **Copper**: A plant removal efficiency of 92.64 percent was calculated using an influent concentration of 0.02005 mg/L and an average effluent concentration of 0.0015 mg/L.
- **Lead**: A plant removal efficiency of 94.05 percent was calculated using an influent concentration of 0.00105 mg/L and an average effluent concentration of 0.00006 mg/L.
- **Mercury:** A plant removal efficiency of 33.33 percent was calculated using an influent concentration of 0.00003 mg/L and an average effluent concentration of 0.00002 mg/L.
- **Nickel:** A plant removal efficiency of 26.42 percent was calculated using an influent concentration of 0.0013 mg/L and an average effluent concentration of 0.0010 mg/L.
- **Zinc**: A plant removal efficiency of 48.55 percent was calculated using an influent concentration of 0.1380 mg/L and an average effluent concentration of 0.071 mg/L.
- **Organics**: Plant removal efficiencies were calculated for chloroform (-85.3 percent), 1,4-dichloro-benzene (-183 percent), bromodichloromethane (-500 percent), toluene (60 percent), and bis(2-ethylhexyl)phthalate (86.82 percent). Where there were negative percent recoveries, literature values were used in the local limits calculations.

Sufficient data above reporting limits were not available for other POCs for plant removal efficiency calculations; therefore, literature values from EPA's Local Limits Development Guidance Manual (EPA 2004) were used. These values are provided in Appendix B, Tables B1 through B4.

3.3 Calculation of AHLs Based on NPDES Permit

An effective means of restricting the discharge of pollutants into receiving waters is through a NPDES permit limit. NPDES is the permitting system established by the Clean Water Act that regulates the discharge of pollutants into the waters of the United States. Such discharges are prohibited unless a NPDES permit is issued by EPA or the state. NPDES permit limits applied to discharges from WPCPs are used in the derivation of local limits to prevent pollutant pass-through. Pass-through is defined as a

discharge that enters the waters of the United States from a WPCP in quantities or concentrations, alone or in complex mixtures, that cause a violation of any requirement of the WPCP's NPDES permit.

The NPDES permit limit for each POC, if applicable, can be found in the WPCP's current NPDES permit and is commonly expressed in mg/L and/or kilograms per day (kg/d). The Rose Creek WPCP's NPDES permit includes limitations for discharging effluent from the WPCP into the receiving stream. Therefore, AHLs are calculated based on the NPDES permit limits for discharge, as described further below.

3.3.1 Calculation of AHLs Based on Effluent Discharge

Rose Creek's NPDES permit for effluent discharge includes monthly average and weekly average discharge limitations for flow, BOD, TSS, ammonia, total phosphorus, fecal coliform bacteria, a minimum and maximum for pH, total chlorine residual, and a daily minimum for dissolved oxygen (DO). The permit also includes reporting requirements for ortho-phosphate, organic nitrogen, nitrate-nitrite, TKN, chronic whole effluent toxicity, and temperature. EPA recommends that only the more conservative monthly average concentrations be used in calculating NPDES-based AHLs.

As illustrated in Equation 3-1, an AHL based on a NPDES permit limit (AHL_{NPDES}) is the pollutant loading at the NPDES permitted flow (C_{NPDES} * Q_{NPDES}) divided by the fraction of the pollutant not removed by the plant (1 – R_{WPCP}).

Equation 3-1

$$AHL_{NPDES} = \frac{(8.34)(C_{NPDES})(Q_{NPDES})}{(1-R_{WPCP})}$$

Where:

$$R_{WPCP} = \frac{\bar{I}_r - \bar{E}_{WPCP}}{\bar{I}_r}$$

and:

AHL_{NPDES}	= AHL based on NPDES permit limit, lb/d
C_{NPDES}	= NPDES permit limit for effluent discharge, mg/L
Q_{NPDES}	= NPDES permitted flow rate for effluent discharge, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
I_r	= WPCP influent pollutant concentration at headworks, mg/L
E_{WPCP}	= WPCP effluent pollutant concentration, mg/L
8.34	= Conversion factor, lb/gal

3.3.1.1 Data Sources and Assumptions

Calculations were performed based on the following components.

3.3.1.1.1 Flow Rates

Rose Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 10 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.3.1.1.2 Permit Limits

NPDES monthly average permit limits for POCs, C_{NPDES}, are 4.0 mg/L BOD, 20.0 mg/L TSS, 0.8 mg/L ammonia, 0.20 mg/L total phosphorus, 0.5 mg/L total residual chlorine, and 50 #/100mL fecal coliform bacteria (Appendix C, Table C2).

3.3.1.1.3 Plant Removal Efficiencies

Site-specific removal efficiencies, R_{WPCP}, described in Section 3.2 were used in this calculation where possible. When site-specific removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.3.1.2 Calculation Results

The data used and calculation results for the AHLs based on NPDES permit limits at the Rose Creek WPCP are provided in Appendix C, Table C2. AHLs based on NPDES permits were calculated only for those pollutants with established permit limits and sufficient data to support the calculations. A summary of AHLs based on NPDES permit limits is provided in Appendix D, Table D3.

3.4 Calculation of AHLs Based on Water Quality Standards

Acute and chronic WQS established by EPD were used to calculate AHLs for the protection of the receiving stream. As illustrated in Equation 3-2, AHLs based on state WQS (AHL_{WQS}) are calculated as the pollutant loading to the water body at the water quality limit [C_{WQS} (Q_{STR} + Q_{WPCP})], adjusted for the background loading of the water body (C_{STR} * Q_{STR}), and divided by the fraction of the pollutant not removed by theE plant (1 - R_{WPCP}).

Equation 3-2

$$AHL_{WQS} = \frac{(8.34)[C_{WQS}(Q_{STR}+Q_{WPCP})-(C_{STR}*Q_{STR})]}{(1-R_{WPCP})}$$

Where:

AHL_{WQS}	= AHL based on state WQS, lb/d
C_{STR}	= Receiving stream background concentration, mg/L
C_{WQS}	= In-stream state WQS, mg/L
Q_{STR}	= Receiving stream (upstream) flow rate, mgd
Q_{WPCP}	= WPCP average flow rate, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
8.34	= Conversion factor, lb/gal

3.4.1 Data Sources and Assumptions

AHLs based on WQS were calculated using Equation 3-2. The following data sources and assumptions were used.

3.4.1.1 Receiving Stream Flow Rates

For the AHLs based on acute WQS, Q_{STR} is the "1Q10" of the receiving stream, which is the lowest average flow for a 1-day period that is expected to occur once every 10 years. For the AHLs based on chronic WQS, Q_{STR} is the "7Q10" of the receiving stream, which is the lowest average flow for a 7-day period that is expected to occur once every 10 years. Per the previous LLE approved by GAEPD, flows were assumed from USGS station 02394000 on the Etowah River and updated per the GAEPD Scientific Investigations Report 2016-5037. The 1Q10 and 7Q10 for the Etowah River are 195 cubic feet per second (cfs) or 126 mgd, and 283 cfs or 183 mgd, respectively (Appendix D, Table D1).

3.4.1.2 Water Quality Standards

The water use classification for the Lake Allatoona Tributary (GAR031501040808) is fishing. Therefore, several sets of WQS are applicable to the stream per *Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6* (DNR 2015), including the following:

- In-stream acute criteria for toxic priority pollutants, as provided in Chapter 391-3-6-.03(5)(ii)
- In-stream criteria for EPA toxic priority pollutants, as provided in Chapter 391-3-6-.03(5)(i), 391-3-6-.03(5)(ii), 391-3-6-.03(5)(iii), and/or 391-3-6-.03(5)(iv).

3.4.1.2.1 Metals

WQS for metals are reported for the dissolved fraction of the metal. Most metals measurements, however, are reported in the total or total recoverable form. Total and total recoverable metals

concentrations are always at least as high as dissolved metals concentrations because a fraction of the metal may be adsorbed onto particulates in the water. Therefore, EPA recommends that WPCPs convert dissolved metals WQS into the total metals form before using the standards to calculate water quality-based AHLs. Metals are also often hardness-dependent. The standards must be adjusted according to the hardness of the receiving stream (upstream, in mg/L as calcium carbonate [$CaCO_3$]). The EPA recommends 25 mg/L for a background hardness. Equations 3-3 through 3-22, listed in Table 3-1 below, were used to calculate total recoverable acute and chronic WQS adjusted for stream hardness.

Table 3-1. Recoverable Acute and Chronic WQS for Metals

Metal	Equation No.	Equation
Arsenic	3-3	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 1.0
	3-4	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 1.0
Cadmium	3-5	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.0166(ln(\ ardness))-3.924} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = (1.136672 - [(ln($hardness$) (0.041838)])
	3-6	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.7409(ln(\ ardness))-4.719} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = (1.101672 - [(ln($hardness$) (0.041838)])
Chromium (III)	3-7	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.819(ln(\ ardness))+3.7256} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.316
	3-8	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.819(ln(\ ardness))+0.6848} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.86
Chromium (VI)	3-9	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.982
	3-10	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.962
Copper	3-11	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.9422(ln(\ ardness))-1.700} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.960
	3-12	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8545(ln(\ ardness))-1.702} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.960

Table 3-1. Recoverable Acute and Chronic WQS for Metals		
Metal	**Equation No.**	**Equation**
Lead	3-13	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.273(ln(\ ardness))-1.460} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = (1.46203 - [(ln(*hardness*) (0.145712)])
	3-14	Chronic WQS DISSOLVED (mg/L) = $e^{1.273(ln(\ ardness))-4.705} * CF/1000$ Chronic WQS TOTAL (mg/L) = Chronic WQS DISSOLVED / CF Where CF = (1.46203 - [(ln(hardness) (0.145712)])
Mercury	3-15	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.85
	3-16	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / *CF* Where CF = 0.85
Nickel	3-17	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(\ ardness))+2.255} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.998
	3-18	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(\ ardness))+0.0584} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / *CF* Where CF = 0.997
Silver	3-19	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.72(ln(\ ardness))-6.59} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.85
	3-20	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not available
Zinc	3-21	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8473(ln(\ ardness))+0.884} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.978
	3-22	Chronic WQS$_{TOTAL}$ (mg/L) = $e^{0.8473(ln(\ ardness))+0.884} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / *CF* Where CF = 0.986

3.4.1.3 Upstream Background Concentrations

CCWSA provided upstream water quality data for four streams and associated flow contributions: Etowah River at Canton (40%), Little River near Woodstock (30%), Shoal Creek near Waleska (15%), and Noonday Creek at Towne Lake (15%). The data was from 2013 to 2019. Average concentrations were weighted according to the proportion of stream flow. This data was used to obtain upstream background concentrations (C_{STR}) for several POCs. Where data were not available, upstream concentrations were assumed to be negligible. These data are provided in Appendix A, Table A5.

3.4.1.4 Flow Rates

Rose Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 10 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Plant removal efficiencies were applied as described in Section 3.3.1.1.

3.4.2 Calculation Results

The calculations for total recoverable metals standards adjusted for stream hardness are provided in Appendix C, Table C4. The final state WQS for POCs are listed in Appendix C, Table C5. The data and calculation results for the AHLs to ensure compliance with the state and/or federal WQS at the WPCP are provided in Appendix D, Tables D7 and D8. AHLs based on WQS were calculated only for those pollutants with established standards or criteria. A summary of AHLs based on WQS is provided in Appendix D, Table D9.

3.5 Calculation of AHLs Based on Treatment Inhibition

Inhibition-based AHLs were calculated to protect against operational problems for biological treatment processes during secondary and/or tertiary treatment. This inhibition can interfere with a WPCP's ability to remove pollutants, including BOD. EPA does not require WPCPs to calculate AHLs based on inhibition threshold levels if current loadings are acceptable to the treatment processes. For WPCP, AHLs were calculated to prevent future loadings that may cause inhibition. Although site-specific inhibition data are preferred, literature data are available for use in developing AHLs when there are no current inhibition problems.

3.5.1 Activated Sludge Treatment Inhibition

As illustrated in Equation 3-23, the AHL based on inhibition of activated sludge treatment (AHL_{SEC1}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion ($C_{INHIB2} * Q_{WPCP}$) by the fraction of the pollutant not removed after primary treatment (1 - R_{PRIM}).

Equation 3-23

$$AHL_{SEC} = \frac{(8.34)(C_{INHIB2})(Q_{WPCP})}{(1-R_{PRIM})}$$

Where:

AHL_{SEC}	= AHL based on inhibition of activated sludge treatment, lb/d
C_{INHIB2}	= Inhibition criterion for activated sludge treatment, mg/L
Q_{WPCP}	= WPCP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.1.1 Data Sources and Assumptions

AHLs based on activated sludge treatment inhibition were calculated using Equation 3-23. The following data sources and assumptions were used.

Activated Sludge Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WPCPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB2}, are provided in Appendix B, Table B5. Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Rose Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 10 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Primary Removal Efficiencies. Primary treatment at the Rose Creek WPCP occurs through a packaged screening structure and secondary treatment occurs through SBRs. Site-specific activated sludge

removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.5.1.2 Calculation Results

The data and calculation results for the AHLs to protect against activated sludge treatment inhibition at the WPCP are provided in Appendix D, Table D4. A summary of AHLs based on activated sludge treatment inhibition is provided in Appendix D, Table D9.

3.5.2 Nitrification Treatment Inhibition

As illustrated in Equation 3-24, the AHL based on inhibition of nitrification treatment (AHL_{TER}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB3} * Q_{WPCP}) by the fraction of the pollutant not removed after secondary treatment (1 - R_{PRIM}).

Equation 3-24

$$AHL_{TER} = \frac{(8.34)(C_{INHIB3})(Q_{WPCP})}{(1-R_{SEC})}$$

Where:

AHL_{TER}	= AHL based on inhibition of nitrification treatment, lb/d
C_{INHIB3}	= Inhibition criterion for nitrification treatment, mg/L
Q_{WPCP}	= WPCP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.2.1 Data Sources and Assumptions

AHLs based on nitrification treatment inhibition were calculated using Equation 3-24. The following data sources and assumptions were used.

Nitrification Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WPCPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB3}, are provided in Appendix B, Table B5. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Rose Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 10 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Secondary Removal Efficiencies. Site-specific removal efficiencies through secondary treatment were not available. Therefore, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. The medians of reported values were used in Equation 3-24 (Appendix B, Table B3).

3.5.2.2 Calculation Results

The data and calculation results for the AHLs to protect against nitrification treatment inhibition at the WPCP are provided in Appendix D, Table D5. A summary of AHLs based on nitrification treatment inhibition is provided in Appendix D, Table D9.

3.6 Calculation of AHLs Based on Sludge Disposal Regulations

Sludge disposal-based AHLs can be calculated for sludge depending on its end use. For example, sludge may be applied to land to condition the soil or fertilize crops, disposed of in a landfill, or incinerated. As stated earlier, sludge from WPCP is currently land applied. WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements (40 CFR 503.13). These federal sludge regulations establish limitations for nine common metals that are controlled primarily by the Pretreatment Program. For all land application of biosolids, WPCPs must comply with the ceiling concentrations of Table 1 in 40 CFR 503. In addition, for biosolids that are applied to agricultural land, a WPCP must also comply with either the cumulative loading rates of Table 2 or the monthly average pollutant concentrations in Table 3 in 40 CFR 503. The criterion used in calculations was the more stringent between the ceiling concentrations, cumulative pollutant loading rates, monthly average pollutant concentrations and landfill disposal – TCLP regulatory levels.

As illustrated in Equation 3-25, the AHL based on sludge regulations (AHL_{SLDG}) is calculated by dividing the pollutant loading of sludge at the sludge standard ($C_{SLDGSTD}$ * Q_{SLDG}) by the overall plant removal efficiency (R_{WPCP}).

Equation 3-25

$$AHL_{SLDG} = \frac{(C_{SLDGSTD})(Q_{SLDG})(0.0022)}{(R_{WPCP})}$$

Where:

AHL_{SLDG}	= AHL based on sludge regulations, lb/d
$C_{SLDGSTD}$	= Most stringent sludge standard, mg/kg-dry
Q_{SLDG}	= Total sludge flow to disposal, dry metric tons/d
R_{WPCP}	= Removal efficiency from headworks to final effluent, decimal
0.0022	= Conversion factor

3.6.1 Data Sources and Assumptions

AHLs based on sludge regulations were calculated using Equation 3-25. The sludge standard used in the equation, $C_{SLDGSTD}$, is the most stringent criteria listed in Tables 1 through 3 of 40 CFR 503 (Appendix C, Table C3. Sludge flow to disposal (Q_{SLDG}) is equal to the average flow of dry sludge to disposal of 341,395 pounds per day (lb/d) (206,906 lb/d increased by 65 percent due to local limits being calculated on full build out) based on data from Rose Creek WPCP (Appendix A, Table A1).

Plant removal efficiencies were applied as discussed in Section 3.3.1.1.

For trivalent and hexavalent chromium, the total chromium standard of 100 mg/kg was used to calculate the sludge disposal AHLs.

3.6.2 Calculation Results

The data and calculation results for the AHLs based on sludge disposal regulations for the WPCP are provided in Appendix D, Table D6. A summary of AHLs based on sludge disposal regulations is provided in Appendix D, Table D9.

3.7 Calculation of AHLs Based on Design Criteria

Some pollutants such as ammonia, BOD, total phosphorus, and TSS require additional evaluation before MAHLs are established because WPCPs are typically designed to treat these pollutants. EPA recommends that WPCPs develop AHLs based on design criteria when the WPCP begins to operate at 80 to 90 percent of its design capacity for 3 to 6 consecutive months. In addition, if the rate of increase in pollutant loadings suggests that the full capacity of the WPCP will be used within 5 to 7 years, then planning to avoid future violations should begin immediately.

As illustrated in Equation 3-26, the AHL based on design criteria (AHL_{DESIGN}) is calculated by multiplying the design criteria (mg/L) by the WPCP permitted flow (mgd).

Equation 3-26 $$AHL_{DESIGN} = 8.34 \times DC \times Q_{NPDES}$$

Where:

AHL_{DESIGN}	= AHL based on design criteria, lb/d
DC	= Design criteria, mg/L
Q_{NPDES}	= WPCP permitted flow rate, mgd
8.34	= Conversion factor, lb/gal

3.7.1 Data Sources and Assumptions

AHLs based on design criteria were calculated using Equation 3-26. The following data sources and assumptions were used.

3.7.1.1 Design Criteria

Rose Creek WPCP was designed to treat maximum month for BOD, TSS, COD, TKN, ammonia and total phosphorus influent concentrations of 488 mg/L, 400, mg/L, 1035 mg/L, 78 mg/L, 63 mg/L, and 11.6 mg/L, respectively. The influent design criteria are from the September 2011 Rose Creek WWTP and Fitzgerald Creek WWTP Capacity Assessment (Table C1) and are provided in Appendix D, Table D2.

Flow Rate. Rose Creek WPCP will have a NPDES build-out permitted flow, Q_{NPDES}, of 10 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.7.2 Calculation Results

The data and calculation results for the AHLs based on design criteria for the Rose Creek WPCP are provided in Appendix D, Table D2. A summary of AHLs is provided in Appendix D, Table D9.

3.8 Special Cases

The following sections describe the methods for developing local limits for other parameters.

3.8.1 Fats, Oils, and Greases

Fats, oils, and greases (FOG) includes materials of vegetable, animal, and mineral origin. The pretreatment regulations in 40 CFR 403.5(b)(6) prohibit the discharge of “petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through.” If treatment inhibition is occurring, WPCPs could calculate FOG removal efficiencies, determine FOG inhibition criteria, and determine AHLs based on inhibition.

According to EPA, most WPCPs have adopted a 100 mg/L limit for FOG of animal or vegetable origin as determined by an approved analytical procedure for oil and grease analysis. CCWSA has historically used 100 mg/L as the local limit for oil and grease and has found this limit to be effective for the treatment plant capacity; therefore, CCWSA will continue to use this limit in this LLE.

3.9 Maximum Allowable Headworks Loadings

Appendix D, Table D9 provides a summary of the AHLs calculated to ensure compliance with each of the environmental criteria: design criteria, NPDES permit limits, activated sludge treatment inhibition, nitrification treatment inhibition, sludge disposal, and WQS. Appendix D, Table D11 identifies the most stringent AHL for each POC, referred to as the MAHL. This loading is the maximum loading the WPCP can accept at the headworks, and it is used to calculate the MAILs and local limits.

EPA recommends that local limits are needed when the current average influent loading of a toxic pollutant exceeds 60 percent of the MAHL or when the maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time during the 12-month period preceding the analysis. Equation 3-27 compares WPCP loadings based on permitted flow to the calculated MAHLs for individual POCs and can be used to calculate the percentage of the MAHL currently being received at the WPCP. The average influent loading was used in this equation for all POCs.

Equation 3-27 $$L_{\%} = \frac{L_{INFL}}{MAHL} * 100$$

Where: $$L_{INFL} = 8.34 \times Q_{WPCP} \times PL$$

and:

$L_{\%}$	=	Percentage of MAHL currently utilized, percent
L_{INFL}	=	Current influent loading (average or daily maximum), lb/d
MAHL	=	Calculated MAHL, lb/d
Q_{WPCP}	=	WPCP average flow rate, mgd
PL	=	Average influent pollutant loading, lb/d
8.34	=	Conversion factor, lb/gal

3.9.1 Data Sources and Assumptions

Average influent and effluent concentrations of conventional pollutants were available for November 2017 through October 2018 (Appendix A, Table A2). Using the average flow rate at the Rose Creek WPCP of 10 mgd and the conversion factor 8.34, the average influent concentrations were converted to average influent loadings for use in Equation 3-27.

3.9.2 Calculation Results

Calculated percentages of MAHLs currently received at the Rose Creek WPCP are provided in Appendix D, Table D11. For those that have been detected, all conventional POCs are below 60 percent of the MAHL (Appendix D, Table D11).

CCWSA has not eliminated any POCs from the evaluation based on current utilizations. Therefore, all POCs included in Table 2-1 were retained for the remainder of the LLE.

3.10 Maximum Allowable Industrial Loadings and Local Limits

The MAIL is the estimated maximum loading of a pollutant that can be received at a WPCP's headworks from all permitted industrial users and other controlled sources without causing pass-through or interference. As shown in Equation 3-28, the MAIL is calculated by subtracting estimates of loadings from uncontrolled sources (L_{UNC}), including septic/hauled waste, from a MAHL adjusted with a safety and growth factor (SGF).

Equation 3-28

$$MAIL = MAHL(1 - SGF) - (L_{UNC})$$

Where:

$$L_{UNC} = (C_{DOM} \times Q_{DOM} \times 8.34) + (C_{HW} \times Q_{HW} \times 8.34)$$

and:

MAIL	=	Maximum allowable industrial loading, lb/d
MAHL	=	Maximum allowable headworks loading, lb/d
L_{UNC}	=	Loadings from uncontrolled sources, lb/d (uncontrolled sources = domestic/commercial + septic/hauled waste)
SGF	=	Safety and growth factor, decimal, if desired
C_{DOM}	=	Domestic and commercial background levels, mg/L
Q_{DOM}	=	Domestic and commercial flow, mgd
C_{HW}	=	Septic/hauled waste levels, mg/L
Q_{HW}	=	Septic/hauled flow, mgd
8.34	=	Conversion factor, lb/gal

A WPCP can then use several basic approaches to assign limits to its controlled or permitted dischargers, including limits based on industrial user contributions of a pollutant, uniform limits for all controlled dischargers, as needed case-by-case, or creative allocation methods. These approaches can vary between WPCPs and pollutants. For this LLE, the concentration-based limits methods, described in EPA's *Local Limits Development Guidance Manual* (EPA 2004), were used to calculate local limits. As illustrated in Equation 3-29, this method of allocating MAILs for conservative pollutants yields one concentration-based limit per pollutant (C_{LIM}) that applies to every controlled discharger. In this equation, the calculated MAIL for each pollutant is divided by the total industrial flow rate, Q_{IND}.

Equation 3-29

$$C_{LIM} = \frac{MAIL}{(Q_{IND})(8.34)}$$

Where:

$$Q_{IND} = Q_{WWTP} - Q_{DOM} - Q_{HW}$$

and:

C_{LIM}	=	Concentration-based local limit, mg/L
MAIL	=	Maximum allowable industrial loading, lb/d
Q_{IND}	=	Total flow rate from industrial sources, mgd
Q_{DOM}	=	Total flow rate from domestic/commercial sources, mgd
Q_{HW}	=	Total flow rate from septic/hauled waste, mgd
Q_{WPCP}	=	WPCP average flow rate, mgd
8.34	=	Conversion factor, lb/gal

3.10.1 Data Sources and Assumptions

Flow Rates. Average flow from domestic and commercial sources (Q_{DOM}) is 9.0 mgd and was calculated by subtracting total industrial flow (Q_{IND}) and septic/hauled waste flow (Q_{HW}) from the Rose Creek WPCP average influent flow rate (Q_{WPCP}) of 10 mgd (Appendix A, Table A1). The total industrial flow, Q_{IND}, of 1.0 mgd, is 10 percent of the total flow estimated by the CCWSA, and the septic/hauled waste, Q_{HW}, receiving at WPCP is estimated from Rose Creek WPCP at 0.004 mgd.

Domestic and Commercial Wastewater Background Concentrations. When site-specific domestic/commercial background concentrations of POCs in wastewater were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used for domestic and commercial background levels (C_{DOM}) of POCs in wastewater (Appendix B, Table B7).

In cases where C_{DOM} values were not available, and for those pollutants not detected in the plant's influent, C_{DOM} was assumed to be negligible.

Safety and Growth Factor. A safety and growth factor is site-specific and depends on local conditions, and incorporates both a safety factor and a growth factor. The main purpose of a safety factor is to address data "uncertainties" that can affect the ability of the WPCP to calculate accurate local limits. At a minimum, EPA recommends a 10 percent safety factor. Safety factors can vary between POCs and should depend on the variability of the WPCP's data, amount of data the WPCP used to develop its MAHLs, quality of the WPCP's data, amount of literature data used, history of compliance with the parameter, and potential for industrial user slug loadings (for example, because of a chemical spill or flood event). In addition to the safety factor, a growth factor can be incorporated to account for anticipated growth in the county from present until the local limits will be reevaluated.

A safety factor of 10 percent was used in the evaluation. No additional growth factor was used.

3.10.2 Calculation Results

Appendix D, Tables D2 through D8 provide the results of converting commercial/domestic background levels and septic/hauled waste concentrations to pollutant loadings from these sources and calculates the AILs. A summary of AILs is provided in Appendix D, Table D10, and the MAILs are identified in Appendix D, Table D11. In some cases, the total domestic/commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. In the case of negative MAILs, the domestic/commercial background concentrations were used as the industrial local limits. The calculated MAILs were then used to calculate industrial local limits, which are also summarized in Appendix D Table D11.

3.10.3 Worker Safety and Protection

The safety and protection of the WPCP workers are also considered in a local limits evaluation. In 1990, EPA issued guidance for reactive and gas/vapor-toxic discharges to WPCPs for the purpose of protecting WPCP workers. This guidance requires WPCPs to identify and control potential exposures to substances in industrial wastewaters that are reactive or that create toxic gases and vapors.

3.10.3.1 Data Sources and Assumptions

Worker Protection Screening Levels for fume toxicity and for explosivity are available in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Similar screening levels are found in EPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 1992). These values are provided in Appendix C Tables C6 and C7. For the two organic POCs evaluated, Worker Protection Screening Level was not applied.

3.10.4 Domestic and Commercial Background Concentrations

In some cases, the total domestic and commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. This situation may arise in part because some of the facilities considered "uncontrollable" are commercial facilities such as gas stations, radiator repair shops, car washes, or hospitals, which may discharge high levels of pollutants. The WPCP may need to evaluate the sources it considers uncontrollable to see if some of them would be better classified as controlled sources with reducible pollutant loadings. There were no negative MAIL or local limits calculated in this evaluation.

3.10.4.1 Data Sources and Assumptions

The domestic and commercial background concentrations used in this screening are provided in Appendix B, Table B7, and are consistent with those described in Section 3.10.1.

3.10.5 Calculation Results

Refer to the four right-most columns in Appendix D Table D11 for results of screening the calculated local limits against Worker Protection Screening Levels and the domestic and commercial background levels.

3.11 Summary

The calculated and proposed local limits that apply to all non-domestic dischargers to the Rose Creek WPCP are discussed below. Based on this comprehensive evaluation, influent loadings below the proposed limits are not expected to cause interferences with treatment processes at the Rose Creek WPCP.

3.11.1 Conventional Pollutants

The following local limits were developed for conventional pollutants:

- **Ammonia:** The calculated local limit of 391 mg/L is based on the most stringent design criteria limit of 63 mg/L. Based on this criterion, the MAHL is 5,291 lb/d with a 31.5 percent current utilization. The local limit will be the design limit of 63 mg/L.
- **Biological oxygen demand:** The calculated local limit of 2,267 mg/L is based on the design criteria of 488 mg/L. Based on this criterion, the MAHL is 35,871 lb/d with a 41.4 percent current utilization. The local limit will be the design limit of 488 mg/L.
- **Chemical oxygen demand:** The calculated local limit of 5,725 mg/L is based on the design criteria of 1,035 mg/L. Based on this criterion, the MAHL is 86,282 lb/d with a 38.5 percent current utilization. The local limit will be the design limit of 1035 mg/L.
- **Total phosphorus:** The calculated local limit of 31.7 mg/L is based on the NPDES permit limit. Based on this criterion, the MAHL is 654 lb/d with a 55.2 percent current utilization. The local limit will be the design limit of 11.6 mg/L.
- **Total suspended solids:** The calculated local limit of 1,845 mg/L is based on the design criteria of 400 mg/L. Based on this criterion, the MAHL is 33,360 lb/d with a 48.8 percent current utilization. The local limit will be the design limit of 400 mg/L.
- **Total Kjeldahl Nitrogen:** The calculated local limit of 702 mg/L is based on the design criteria of 78 mg/L. Based on this criterion, the MAHL is 6,505 lb/d with a 55.2 percent current utilization. The local limit will be the design limit of 78 mg/L.

Per the request of CCWSA, conventional pollutants were lowered to the design criteria values to be conservative and further protect the WPCP. If additional loading or changes to loadings are applied to the Rose Creek WPCP, a new LLE will need to be completed to assess if pollutant limits will need to be re-instated.

3.11.2 Inorganic Pollutants

For the current evaluation, EPD provided upstream background concentrations, including hardness, which was used to adjust metals that are hardness-dependent. The receiving stream's hardness was assumed at 25 mg/L.

- **Antimony:** The calculated local limit of 111 mg/L is based on the chronic water quality standard of 0.64 mg/L. Due to the high calculated limit and no percent of MAHL in use, no local limit is needed.
- **Arsenic:** The calculated local limit of 0.893 mg/L is based on activated sludge treatment inhibition. The local limit is recommended for 0.893 mg/L.
- **Cadmium:** The calculated local limit for cadmium is 0.034 mg/L, based on the chronic water quality standard of 0.000097 mg/L. The local limit is recommended for 0.034 mg/L.

- **Total chromium:** Because hexavalent chromium is known to be the more toxic form of total chromium and there are now separate WQS for hexavalent and trivalent chromium, it is recommended to develop local limits for hexavalent and trivalent forms of chromium. A local limit for total chromium was still calculated at 4.52 based on sludge disposal.
- **Hexavalent chromium:** The calculated local limit for hexavalent chromium is 5.04 mg/L, based on the chronic water quality standard of 0.0114 mg/L. The local limit is recommended for 5.04 mg/L.
- **Trivalent chromium:** The calculated local limit for trivalent chromium is 5.11 mg/L, based on sludge disposal. The local limit is recommended for 5.11 mg/L.
- **Copper:** The calculated local limit of -188 mg/L is based on the chronic State WQS of 0.0029 mg/L. A negative local limit indicates that due to domestic/commercial background loading of 0.020 mg/L and upstream background loading of 0.087 mg/L, there is no additional loading available to industrial users. Therefore, the local limit for this parameter was set equal to the domestic/commercial background concentration of 0.02 mg/L. The local limit will be set at 0.02 mg/L.
- **Cyanide:** The calculated local limit of 2.66 mg/L is based on the chronic water quality standard of 0.0052 mg/L. The local limit is recommended for 2.66 mg/L.
- **Lead:** The calculated local limit for lead is -3.95 mg/L, based on the chronic water quality standard of 0.00054 mg/L. A negative local limit indicates that due to domestic/commercial background loading of 0.001 mg/L and upstream background loading of 0.002 mg/L, there is no additional loading available to industrial users. Therefore, the local limit for this parameter was set equal to the domestic/commercial background concentration of 0.001 mg/L. The local limit is recommended for 0.001 mg/L.
- **Mercury:** The calculated local limit for mercury is 0.003 mg/L, based on the chronic water quality standard of 0.000014 mg/L. The local limit is recommended for 0.003 mg/L.
- **Molybdenum:** The calculated local limit for molybdenum is 9.52 mg/L, based on sludge disposal regulations. Since there is currently no loading for molybdenum, no local limit is needed.
- **Nickel:** The calculated local limit for nickel is 3.80 mg/L based on the chronic water quality standard of 0.016 mg/L. The local limit is recommended for 3.80 mg/L.
- **Selenium:** The calculated local limit for selenium is 1.47 mg/L, based on sludge disposal regulations. The local limit is recommended for 1.47 mg/L.
- **Silver:** The calculated local limit for silver is 0.11 mg/L, based on the acute water quality standard of 0.00035 mg/L. The local limit is recommended for 0.11 mg/L.
- **Zinc:** The calculated local limit for zinc is 2.33 mg/L, based on nitrification treatment inhibition. The local limit is recommended for 2.33 mg/L.

3.11.3 Organic Pollutants

Based on the initial screening for POCs, two organic pollutants were added to the evaluation based on their detection in the plant's influent or effluent scans, or an industrial user's effluent, and if there is an applicable criterion on which to base a defensible local limit. MAHLs, MAILs, and local limits were calculated for these two parameters. The organics evaluation is included below:

- **Chloroform:** The calculated local limit for chloroform of 8.25 mg/L is based on sludge disposal. The local limit of 8.25 for chloroform is recommended.
- **Bis(2-ethylhexyl)phthalate:** The calculated local limit for Bis(2-ethylhexyl)phthalate of 2.84 mg/L is based on chronic state water quality standards. The local limit of 2.84 for bis(2-ethylhexyl)phthalate is recommended.

3.11.4 Other Pollutants

The following local limits were developed for other pollutants:

- **Fats, Oils, and Grease:** The local limit for FOG is 100 mg/L, based on EPA's guidance document, *Controlling Fats, Oils, and Grease Discharges from Food Service Establishments* (September 2012). Per EPA, local limits for FOG typically range between 50 and 450 mg/L, with 100 mg/L as the most commonly reported value.

Section 4

Industrial Allocations

This section describes the methodologies used to allocate the MAILs to the permitted industries.

4.1 Introduction

A WPCP has several options available for applying limits to its controllable sources, including permitted industries. Limits can be applied as concentration-based limits (typically in mg/L) or mass-based limits (typically in lb/day), or both. The type of limit is in part dependent on the type of method used by the WPCP to allocate the MAILs among the dischargers. There are several methods commonly used to allocate limits.

The uniform method of allocating MAILs is a very commonly used method that yields one limit per pollutant that applies to all IUs regardless of size, permitted flow, or discharge. This method is not always preferred, since some IUs that do not discharge the pollutant may be given an allocation of the MAIL that they may not need whereas other IUs that do discharge that same pollutant may have to pretreat to comply with the uniform local limit.

Two additional methods of allocating MAILs among IUs are flow-based or mass-based limits. Flow-based limits are based on the permitted flows of each IU, whereas the mass-based limits are based on the proportion of the discharger's loadings to the total influent loadings at the WPCP.

Finally, a WPCP may set limits specific to each IU on a case-by-case basis. This type of allocation allows the WPCP personnel to use their knowledge of each IU discharge in conjunction with their own judgment in setting limits. This method can be used in conjunction with either flow-based or mass-based limits.

4.2 Allocations of MAILs

For this evaluation, industrial limits were allocated to the IU's using a combination of flow basis and case-by-case basis. Once the MAIL for each pollutant was calculated, it was distributed between current and future potential industries. For the purpose of this evaluation, 10 percent of the MAILs were allocated to future potential industries. This serves as an added safety factor and allows for some industrial growth.

Equation 5.1 was used to calculate flow-based allocations of the MAILs.

Equation 5.1 $$ALLOC_{PP} = (MAIL) - (L_{FUTURE})$$

Where: $$L_{FUTURE} = (MAIL) \times (F_{FUTURE})$$

and:

$ALLOC_{PP}$	= Portion of the MAIL allocated to Pilgrim's Pride, lb/day
MAIL	= Maximum allowable industrial loading, lb/day
L_{FUTURE}	= Amount of loading allocated to future potential industries, lb/day
F_{FUTURE}	= Fraction of MAIL to be allocated to future potential industries, decimal

4.2.1 Data Sources and Assumptions

The permitted flow was based on 10 percent of the total flow of the Rose Creek WPCP to anticipate future growth. The permitted flow used for calculations was 1 mgd.

Average effluent concentrations of conventional pollutants and priority pollutants from IU's are provided upon request. Current IU discharging to the Rose Creek WPCP is Pilgrim's Pride.

4.2.2 Calculation Results

The data and calculation results for the allocations of industrial loadings to IU's are provided in Appendix D. The allocated loadings to current and future potential industries at Rose Creek WPCP are summarized in Section 5.

4.3 Summary

Concentration-based permit limits were developed for IU's for discharge to Rose Creek WPCP. The permit limits for the Rose Creek WPCP are summarized in Section 5. For the chromium local limit, CCWSA may either elect to set industrial permit limits for total chromium or for the speciated form (trivalent and hexavalent chromium)f.

Section 5

Final Proposed Local Limits

Table 5-1 provides a summary of the calculated concentration-based local limits for the Rose Creek WPCP. The final proposed local limits are as follows:

Table 5-1. Summary of Local Limits for Rose Creek WPCP

	Calculated Local Limits (mg/l)	Technical basis
Conventional pollutants		
Ammonia (as N)	63	Design criteria
Biochemical Oxygen Demand (BOD)	488	Design criteria
Chemical Oxygen Demand (COD)	1,035	Design criteria
Phosphorus, Total (as P)	11.6	Design criteria
Suspended Solids, Total (TSS)	400	Design criteria
Kjeldahl Nitrogen, Total (TKN)	78	Design criteria
Inorganic Pollutants		
Arsenic	0.893	Activated Sludge Treatment Inhibition
Cadmium	0.034	Chronic State WQS
Chromium III	5.11	Sludge Disposal
Chromium VI	5.04	Chronic State WQS
Chromium, Total	4.52	Sludge Disposal
Copper	0.02	Chronic State WQS
Cyanide	2.66	Chronic State WQS
Lead	0.001	Chronic State WQS
Mercury	0.003	Chronic State WQS
Nickel	3.80	Chronic State WQS
Selenium	1.47	Sludge Disposal
Silver	0.11	Acute State WQS
Zinc	2.33	Nitrification Treatment Inhibition
Organic Pollutants		
Bis(2-ethylhexyl)Phthalate	2.84	Chronic State WQS
Chloroform	8.25	Sludge Disposal
Other Pollutants		
Oil and Grease	100	EPA Recommendation

Section 6

Limitations

This document was prepared solely for CCWSA in accordance with professional standards at the time the services were performed and in accordance with the Agreement for General Engineering Services between CCWSA and BC dated October 6, 2017 and the Notice to Proceed dated August 13, 2018. This document is governed by the specific scope of work authorized by CCWSA; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by CCWSA and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 7

References

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Appendix A: Rose Creek WPCP Data

Table A1. Flow Summary for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority						
Date	Influent Flow (mgd)		Effluent Flow (mgd)		Sludge to Landfill	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average (dry lb/day)	Monthly Average (dry tons/day)
Nov - 2017	2.90	4.92	2.33	2.83	170510	85
Dec - 2017	3.07	3.55	2.51	2.94	197254	99
Jan - 2018	3.05	3.69	2.49	2.92	226045	113
Feb - 2018	3.59	5.79	2.81	3.86	247391	124
Mar - 2018	3.78	4.33	2.82	3.46	212252	106
Apr - 2018	3.69	5.26	2.78	4.23	226413	113
May - 2018	3.56	4.24	2.70	3.39	228221	114
Jun - 2018	3.61	4.49	2.71	3.40	227013	114
Jul - 2018	3.59	4.27	2.63	2.91	185998	93
Aug - 2018	3.75	4.59	2.74	3.54	223408	112
Sep - 2018	3.44	7.97	2.55	2.92	196954	98
Oct - 2018	3.35	5.44	2.56	4.45	141407	71
Averages	3.45	4.88	2.64	3.40	206,906	104
Maximum	3.78	7.97	2.82	4.45	247,391	124
Minimum	2.90	3.55	2.33	2.83	141,407	71

Table A2. Influent and Effluent Summary for Conventional Pollutants for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Year	Influent BOD (mg/L)		Effluent BOD (mg/L)		Influent NH_3 (mg/L-N)		Effluent NH_3 (mg/L-N)		Influent Phosphorus (mg/L)		Effluent Phosphorus (mg/L)		Influent TKN[a] (mg/L)		Effluent TKN (mg/L)		Influent TSS (mg/L)		Effluent TSS (mg/L)	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum
Nov-17	319	708	3.1	4.0	36	46	0.12	0.84	6.90	8.30	0.19	0.39	48	61	1.0	1.4	317	583	2.1	4.2
Dec-17	369	664	3.2	4.0	31	38	0.23	0.55	7.00	8.60	0.23	0.74	47	48	1.0	1.2	362	847	2.1	4.2
Jan-18	304	426	2.5	4.0	37	45	0.25	0.52	7.63	9.30	0.19	0.52	52	72	0.8	1.2	272	578	1.5	3.2
Feb-18	273	382	2.9	5.0	29	38	0.27	2.08	7.00	8.50	0.24	0.65	43	44	0.7	0.9	269	360	1.7	2.5
Mar-18	271	399	3.0	5.0	43	44	0.16	0.23	6.10	6.90	0.16	0.36	42	48	0.7	0.9	277	372	1.5	2.8
Apr-18	314	620	2.6	4.0	40	46	0.15	0.39	6.40	7.10	0.17	0.35	28	28	0.7	1.1	327	547	1.8	3.8
May-18	310	694	2.5	4.0	30	34	0.17	0.24	8.68	13.40	0.17	0.37	42	48	0.6	0.7	352	848	1.6	2.5
Jun-18	260	321	2.4	3.0	32	33	0.29	0.58	7.50	9.60	0.16	0.40	39	40	0.7	0.8	301	374	1.7	2.8
Jul-18	287	407	2.7	4.0	31	34	0.42	0.84	7.18	7.80	0.19	0.37	35	39	0.7	1.0	346	509	2.0	5.6
Aug-18	271	350	3.1	4.0	35	35	0.32	0.92	7.20	7.50	0.20	0.52	43	57	0.7	1.7	331	462	1.9	5.0
Sep-18	298	368	2.5	4.0	33	38	0.41	2.75	7.65	9.00	0.15	0.34	46	46	1.6	3.7	391	583	2.3	2.8
Oct-18	289	381	2.4	3.0	24	32	0.26	0.78	7.28	8.20	0.18	0.47	50	50	0.6	0.9	362	586	1.7	4.4
Average	297	477	2.8	4.0	33.3	38.6	0.3	0.89	7.21	8.68	0.18	0.46	43	48	0.8	1.30	325	554	1.8	3.65
Maximum	369	708	3.2	5.0	42.5	46.0	0.4	2.75	8.68	13.40	0.24	0.74	52	72	1.6	3.72	391	848	2.3	5.60
Minimum	260	321	2.4	3.0	24.3	32.0	0.1	0.23	6.10	6.90	0.15	0.34	28	28	0.6	0.66	269	360	1.5	2.50
Removal Efficiency (%)	99.07%				99.24%				97.45%				98.11%				99.44%			

[a]Influent TKN data are taken from the 2017 monthly data due to no information from May thru August 2018.

Abbreviations:

mg/L - milligrams per liter.
BOD - Biochemical Oxygen Demand.
NH_3 - Ammonia.
TKN - Total Kjeldahl Nitrogen.
TSS - Total Suspended Solids.

Table A3. Influent and Effluent Summary for Inorganic Pollutants for Rose Creek WPCP[a]
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Year	Arsenic (mg/L)		Chromium (mg/L)		Hexavalent Chromium (mg/L)		Copper (mg/L)		Lead (mg/L)		Mercury (mg/L)		Nickel (mg/L)		Zinc (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
8/23/17 (RC-comp)	**0.0012**	**0.0009**	**0.0024**	*0.00025*	*0.005*	*0.005*	**0.0198**	**0.0028**	**0.0007**	**0.00009**	**0.00004**	*0.00002*	**0.0024**	**0.0017**	**0.126**	**0.061**
7/17/18 (RC-comp)	*0.00025*	*0.00025*	*0.00025*	*0.00025*	**0.021**	*0.005*	**0.0203**	*0.00015*	**0.0014**	*0.000035*	*0.00002*	*0.00002*	*0.00025*	*0.00025*	**0.15**	**0.081**
Average	0.0007	0.0006	0.00133	0.0003	0.01300	0.0050	0.02005	0.0015	0.00105	0.00006	0.00003	0.00002	0.0013	0.0010	0.1380	0.0710
Maximum	0.0012	0.0009	0.0024	0.0003	0.0210	0.0050	0.0203	0.0028	0.00140	0.00009	0.0000	0.00002	0.0024	0.0017	0.1500	0.0810
Minimum	0.0003	0.0003	0.0003	0.0003	0.0050	0.0050	0.0198	0.0002	0.0007	0.0000	0.00002	0.00002	0.0003	0.0003	0.1260	0.0610
Removal Efficiencies (%)	20.69%		81.13%		61.54%		92.64%		94.05%		33.33%		26.42%		48.55%	

[a]Influent and Effluent are taken from Rose Creek-WPCP

[b]Pollutants with negative or low removal efficiencies are due to inconsistency in reporting limits. Literature values were used.

Abbreviations:

mg/L - milligrams per liter.

NS- Not Sampled.

Notes:

Values in italics were nondetect and are therefore represent half the method detection limit.

Table A4. Influent and Effluent Summary for Organics for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority										
Year	Chloroform[a] (mg/L)		1,4-Dichlorobenzene[a] (mg/L)		Bromodichloromethane[a] (mg/L)		Toluene[b] (mg/L)		Bis(2-ethylhexyl)phthalate (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
8/24/17 (RC-grab)	**0.0013**	**0.0037**	*0.0003*	**0.0014**	*0.0002*	**0.0022**	**0.0006**	*0.00015*	*NS*	*NS*
8/23/17 (RC-comp)	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	**0.062**	**0.006**
7/18/18 (RC-grab)	**0.0021**	**0.0026**	*0.0003*	*0.0003*	*0.0002*	*0.0002*	*0.00015*	*0.00015*	*NS*	*NS*
7/17/18 (RC-comp)	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*0.0025*	*0.0025*
Averages	0.0017	0.0032	0.0003	0.0009	0.0002	0.0012	0.0004	0.0002	0.0323	0.0043
Maximum	0.0021	0.0037	0.0003	0.0014	0.0002	0.0022	0.0006	0.0002	0.0620	0.0060
Minimum	0.0013	0.0026	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0025	0.0025
Removal Efficiencies (%)	-85.29%		-183.33%		-500.00%		60.00%		86.82%	

[a]Pollutants with negative or low removal efficiencies are due to inconsistency in reporting limits. Literature values were used.

Abbreviations:

mg/L - milligrams per liter.

NS- Not Sampled.

Notes:

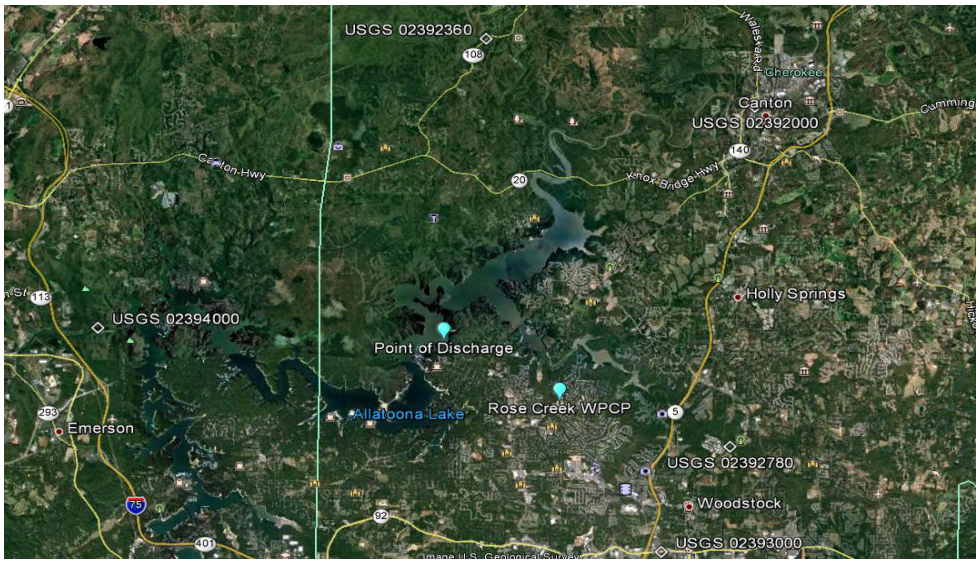
Values in italics were nondetect and are therefore represent half the reporting limit.

Table A5. Upstream Background Concentration Summary for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Monitoring Location Information		
Receiving Stream	Etowah River Arm of Lake Allatoona	
Monitoring Location ID	NA	
Monitoring Location Name[a]	Etowah River Arm of Lake Allatoona	
Date Range	NA	
Parameter[b]	Average Concentration (mg/L unless noted)	
Conventional Pollutants		
pH (SU)	7.21	
Temperature (°C)	17.82	
DO	9.06	
Conductivity (µS/cm)	113.31	
Alkalinity	26.88	
Turbidity (NTU)	18.69	
Suspended Solids, Total (TSS)	27.91	
Ammonia	*0.50*	
Nitrate/Nitrite as N	1.01	
Nitrite	0.01	
Nitrate	1.43	
Total Nitrogen	1.56	
Kjeldahl Nitrogen, Total (TKN)	*0.05*	
Orthophosphate	0.10	
Phosphorus, Total (as P)	0.056	
Hardness (CaCO3)	30.20	
Biochemical Oxygen Demand (BOD)	1.07	
Inorganic Pollutants	**Total (used in calculation)**	**Dissolved**
Cadmium	*0.00021*	*0.00021*
Copper	0.0870	0.0430
Lead	0.0020	*0.0004*
Zinc	0.020	0.004

NA- Not Applicable

[a]CCSWA wet weather stream data is a weighted average: Etowah River near Canton, Little River near Woodstock, Shoal Creek near Waleska, and Noonday Creek on Towne Lake.

[b]Non-detected parameters are reported in italics and as half the reporting limit. Non-detect pollutants were considered negligible in the Local Limits Calculations.



Appendix B: Literature Data

Table B1. Treatment Plant Removal Efficiencies - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Pollutant	Median (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics		
Barium	73	1 of 47
Cadmium	28	7 of 47
Chromium	68	10 of 47
Copper	65	25 of 47
Cyanide	18	3 of 47
Lead	45	12 of 47
Nickel	34	10 of 47
Silver	41	4 of 47
Zinc	62	27 of 47
Organics		
1,2-trans-Dichloroethylene	86	1 of 47
Phenols	64	9 of 47
Bis(2-Ethylhexyl)Phthalate	26	7 of 47
Di-N-Butyl Phthalate	52	1 of 47
Di-N-Octyl Phthalate	78	2 of 47
Diethyl Phthalate	70	3 of 47
Trichloroethylene	97	1 of 47

Source: USEPA's Region 8 *Technically-Based Local Limits Development Strategy*, April 11, 2003, page 113.

Table B2. Primary Treatment Removal Efficiencies[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Pollutant	Median (%)	No. of POTWs with Removal Data[b]
Metal/Nonmetal Inorganics		
Cadmium	15	6 of 40
Chromium, Total	27	12 of 40
Copper	22	12 of 40
Cyanide	27	12 of 40
Lead	57	1 of 40
Mercury	10	8 of 40
Nickel	14	9 of 40
Silver	20	4 of 40
Zinc	27	12 of 40
Organics		
1,1,1-Trichloroethane	40	10 of 40
1,2-trans-Dichloroethylene	36	9 of 40
Benzene	25	8 of 40
Butyl benzyl phthalate	62	4 of 40
Chloroform	14	11 of 40
Diethyl phthalate	56	1 of 40
Di-n-butyl phthalate	36	3 of 40
Ethylbenzene	13	12 of 40
Naphthalene	44	4 of 40
Phenol	8	11 of 40
Tetrachloroethylene	4	12 of 40
Trichloroethylene	20	12 of 40

[a] Pollutant removals between POTW influent and primary effluent. From *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume I (EPA 440/1-82/303), USEPA, Washington, DC, September 1982, page 61.

[b] Median removal efficiencies from a database of removal efficiencies for 40 POTWs. Only POTWs with average influent concentrations exceeding three times each pollutant's detection limit were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-55, Table 3-9.

Table B3. Removal Efficiencies Through Activated Sludge Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Arsenic	11-78	31	45	53	5 of 26
Cadmium	25-99	33	67	91	19 of 26
Chromium	25-97	68	82	91	25 of 26
Copper	2-99	67	86	95	26 of 26
Cyanide	3-99	41	69	84	25 of 26
Lead	1-92	39	61	76	23 of 26
Mercury	1-95	50	60	79	20 of 26
Molybdenum[c]	6-71		29		6
Nickel	2-99	25	42	62	23 of 26
Selenium	25-89	33	50	67	4 of 26
Silver	17-95	50	75	88	24 of 26
Zinc	23-99	64	79	88	26 of 26
Organics[b]					
1,1,1-Trichloroethane	18-99	75	85	94	23 of 26
1,2-trans-Dichloroethylene	17-99	50	67	91	17 of 26
Anthracene	29-99	44	67	1	5 of 26
Benzene	25-99	50	80	96	18 of 26
Bis (2-ethylhexyl) phthalate	17-99	47	72	87	25 of 26
Butyl benzyl phthalate	25-99	50	67	92	16 of 26
Chloroform	17-99	50	67	83	24 of 26
Diethyl phthalate	17-98	39	62	90	15 of 26
Di-n-butyl phthalate	11-97	39	64	87	19 of 26
Ethylbenzene	25-99	67	86	97	25 of 26
Methylene Chloride	2-99	36	62	77	26 of 26
Naphthalene	25-98	40	78	90	16 of 26
Phenanthrene	29-99	37	68	86	6 of 26
Phenol	3-99	75	90	98	19 of 26
Pyrene	73-95	76	86	95	2 of 26
Tetrachloroethylene	15-99	50	80	93	26 of 26
Toluene	25-99	80	93	98	26 of 26
Trichloroethylene	20-99	75	89	98	25 of 26

[a] Pollutant removals between POTW influent and secondary effluent (including secondary clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All secondary activated sludge treatment plants sampled as part of the study were considered.

[c] Source: USEPA Region 8, Technically Based Local Limits Development Strategy, April 11, 2003.

Source (unless otherwise noted): *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-57, Table 3-11.

Table B4. Removal Efficiencies Through Tertiary Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Cadmium	33-81	50	50	73	3 of 4
Chromium	22-93	62	72	89	4 of 4
Copper	8-99	58	85	98	4 of 4
Cyanide	20-93	32	66	83	4 of 4
Lead	4-86	9	52	77	3 of 4
Mercury	33-79	43	67	75	4 of 4
Nickel	4-78	17	17	577	3 of 4
Silver	27-87	55	62	82	3 of 4
Zinc	1-90	50	78	88	4 of 4
Organics[b]					
1,1,1-Trichloroethane	50-98	79	94	97	4 of 4
1,2-trans-Dichloroethylene	50-96	50	83	93	2 of 4
Benzene	5-67	40	50	54	2 of 4
Bis (2-ethylhexyl) phthalate	45-98	59	76	94	4 of 4
Butyl benzyl phthalate	25-94	50	63	85	4 of 4
Chloroform	16-75	32	53	64	3 of 4
Diethyl phthalate	20-57	29	38	50	3 of 4
Di-n-butyl phthalate	14-84	27	50	70	4 of 4
Ethylbenzene	65-95	80	89	94	3 of 4
Methylene Chloride	11-96	31	57	78	4 of 4
Naphthalene	25-94	33	73	86	3 of 4
Phenol	33-98	80	88	96	4 of 4
Tetrachloroethylene	67-98	80	91	97	4 of 4
Toluene	50-99	83	94	97	4 of 4
Trichloroethylene	50-99	62	93	98	4 of 4

[a] Pollutant removals between POTW influent and tertiary effluent (including final clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.
Tertiary treatment was taken to include POTWs with effluent microscreening, mixed media filtration, post aeration, and/or nitrification/denitrification.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All tertiary treatment plants sampled as part of the study were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-58, Table 3-12.

Table B5. Activated Sludge Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	1	1-10	Unknown
Chromium, Total	1	1-100	Pilot
Chromium III	10	10-50	Unknown
Chromium VI	1	1	Unknown
Copper	1	1	Pilot
Lead	0.1	0.1-5.0	Unknown
		10-100	Lab
Nickel	1	1.0-2.5	Unknown
		5	Pilot
Zinc	0.08	0.08-5	Unknown
		5-10	Pilot
Arsenic	0.1	0.1	Unknown
Mercury	0.1	0.1-1	Unknown
		2.5 as Hg(II)	Lab
Silver	0.25	0.25-5	Unknown
Cyanide	0.1	0.1-5	Unknown
		5	Full
Ammonia	480	480	Unknown
Iodine	10	10	Unknown
Sulfide	25	25-30	Unknown
Organics			
Anthracene	500	500	Lab
Benzene	100	100-500	Unknown
		125-500	Lab
2-Chlorophenol	5	5	Unknown
		20-200	Unknown
1,2 Dichlorobenzene	5	5	Unknown
1,3 Dichlorobenzene	5	5	Unknown
1,4 Dichlorobenzene	5	5	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dimethylphenol	50	40-200	Unknown
2,4-Dinitrotoluene	5	5	Unknown
1,2-Diphenylhydrazine	5	5	Unknown
Ethylbenzene	200	200	Unknown
Hexachlorobenzene	5	5	Unknown
Naphthalene		500	Lab
		500	Unknown
		500	Unknown
Nitrobenzene	30	30-500	Unknown
		500	Lab
		500	Unknown
Pentachlorophenol	0.95	0.95	Unknown
		50	Unknown
		75-150	Lab
Phenathrene	500	500	Lab
		500	Unknown
Phenol	50	50-200	Unknown
		200	Unknown
		200	Unknown
Toluene	200	200	Unknown
1,2,6 Trichlorophenol	50	50-100	Lab
Surfactants	100	100-500	Unknown

[a] References/Sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program*; pages 3-44 and 3-45, Table 3-2.

Table B6. Nitrification Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	5.2	5.2	Lab
Chromium, Total	0.25	0.25-1.9	Unknown
Chromium VI	1	1-10	As CrO_4^{2-}; Unknown
Copper	0.05	0.05-0.48	Unknown
Lead	0.5	0.5	Unknown
Nickel	0.25	0.25-0.5	Unknown
		5	Pilot
Zinc	0.08	0.08-0.5	Unknown
Arsenic		1.5	Unknown
Cyanide	0.34	0.34-.5	Unknown
Chloride		180	Unknown
Organics			
Chloroform	10	10	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dinitrophenol	150	150	Unknown
Phenol	4	4	Unknown
		4-10	Unknown

[a] References/sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-47, Table 3-4.

Table B7. Domestic/Commercial Pollutant Loadings Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority					
Pollutant	USEPA Literature Values[a]				
	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)
Metal/Nonmetal Inorganics					
Arsenic	140	205	0.0004	0.088	0.007
Barium	3	3	0.04	0.216	0.115
Boron	4	4	0.1	0.42	0.3
Cadmium	361	538	0.00076	0.11	0.008
Chromium III	1	2	<0.005	0.007	0.006
Chromium, Total	311	522	<0.001	1.2	0.034
Copper	603	607	0.005	0.74	0.14
Cyanide	7	7	0.01	0.37	0.082
Fluoride	2	2	0.24	0.27	0.255
Iron	18	18	0.0002	3.4	0.989
Lead	433	540	0.001	2.04	0.058
Lithium	2	2	0.03	0.031	0.031
Manganese	3	3	0.04	0.161	0.087
Mercury	218	235	<0.0001	0.054	0.002
Nickel	313	540	<0.001	1.6	0.047
Phosphate	2	2	27.4	30.2	28.8
Total Phosphorus	1	1	0.7	0.7	0.7
Silver	181	224	0.0007	1.052	0.019
Zinc	636	638	0.01	1.28	0.231
Organics					
Chloroform	21	30	<0.002	0.069	0.009
1,1-Dichloroethene	2	29	0.005	0.008	0.007
1,1-Dichloroethane	1	28	0.026	0.026	0.026
Trans-1,2-Dichloroethene	1	28	0.013	0.013	0.013
Fluoranthene	2	5	0.00001	<0.001	0.001
Methylene Chloride	7	30	0.00008	0.055	0.027
Phenols	2	2	0.00002	0.00003	0.000025
Bis(2-ethylhexyl)Phthalate	5	5	0.00002	0.022	0.006
Pyrene	2	3	0.00001	<0.005	0.0002
Tetrachloroethylene	5	29	0.00001	0.037	0.014
1,2,4-Trichlorobenzene	1	3	<0.002	0.035	0.013
Pesticides					
Total BHC	3	3	0.001	0.001	0.001
4,4-DDD	3	3	0.00026	0.0004	0.0003
Total Endosulfan	3	3	0.002	0.002	0.002

[a] Source: USEPA *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Programs*, May 1991.

Appendix C: Regulatory Limits and Criteria

Table C1. Influent Basis of Design for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority		
Parameter	Rose Creek WPCP Design Influent Criteria[a]	
	Maximum Day	Maximum Month
Biochemical Oxygen Demand (BOD) (mg/L)	488	313
Chemical Oxygen Demand[b] (COD) (mg/L)	1035	664
Ammonia[c] (mg/L)	63	41
Suspended Solids, Total (TSS) (mg/L)	400	256
Total Kjeldahl Nitrogen (TKN) (mg/L)	78.0	50.0
Phosphorus, Total (as P) (mg/L)	11.6	7.4
Minimum Temperature, °C (Winter)	13	13
Minimum Temperature, °C (Summer)	26	26

[a] Influent-based design criteria are from the September 2011 *Rose Creek WWTP and Fitzgerald Creek WWTP Capacity Assessment* prepared for Cherokee County Water & Sewerage Authority.

[b] Design Criteria for COD is based on a COD/BOD ratio of 2.12.

[c] Design Criteria for ammonia is based on a NH3-N:BOD ratio of 0.13.

Table C2. NPDES Permit Limits for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority				
Parameter	Rose Creek WPCP Discharge Limitations to the Etowah River[a]		Rose Creek WPCP Future Discharge Limitations to the Etowah River[a]	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
Flow, mgd	6.0	7.5	10	12.5
Biochemical Oxygen Demand (BOD), mg/L (kg/day)	6.7 (152)	10.1 (190)	4.0 (152)	6.0 (190)
Total Suspended Solids (TSS), mg/L (kg/day)	20 (455)	30 (569)	20 (758)	30 (948)
Fecal Coliform (#/100 mL)	50	100	50	100
Ammonia, as N mg/L (kg/day)	1.3 (30)	2.0 (37)	0.8 (30)	1.2 (38)
Total Phosphorus, as P, mg/L (kg/day)	0.36 (8.2)	0.54 (10.2)	0.2 (7.6)	0.3 (9.5)
Total Residual Chlorine, mg/L (kg/day)	0.5	0.5	0.5	0.5
pH, Minimum to Maximum, Standard Unit (SU)	6.0 to 9.0		6.0 to 9.0	
Dissolved Oxygen (DO), Minimum, mg/L	6.0		6.0	
Temperature (F)	Report		Report	
Ortho-Phosphate, as P	Report		Report	
Nitrate, as N	Report		Report	
Total Kjeldahl Nitrogen, as N	Report		Report	
Long Term Biochemical Oxygen Demand	Report		Report	
Whole Effluent Toxicity (WET) Test	Report NOEC		Report NOEC	
Priority Pollutants	NA		Report	

[a] Discharge limitations are from the Rose Creek Water Pollution Control Plant, NPDES Permit No. GA0046451, effective April 1, 2015.

Table C3. Biosolids Land Application and Landfill Regulatory Limits
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Parameter	Ceiling Concentration (Table 1, 40 CFR 503.13)[a]		Cumulative Pollutant Loading Rates (Table 2, 40 CFR 503.13)[a]		Monthly Average Pollutant Concentration (Table 3, 40 CFR 503.13)[a]		Landfill Disposal - TCLP Regulatory Level[b]		Most Stringent Criteria (mg/kg-dry)
	mg/kg-dry	lb/1,000 lbs-dry	kg/hectare-dry	lb/acre-dry	mg/kg-dry	lb/1,000 lb-dry	mg/L	mg/kg-dry	
Inorganic Pollutants									
Arsenic	75	75	41	37	41	41	5.0	100	41
Barium	-----	-----	-----	-----	-----	-----	100	2000	2000
Cadmium	85	85	39	35	39	39	1.0	20	20
Chromium, Total	-----	-----	-----	-----	-----	-----	5.0	100	100
Copper	4,300	4,300	1,500	1,338	1,500	1,500	-----	-----	1500
Lead	840	840	300	268	300	300	5.0	100	100
Mercury	57	57	17	15	17	17	0.2	4.0	4.0
Molybdenum	75	75	-----	-----	-----	-----	-----	-----	75
Nickel	420	420	420	375	420	420	-----	-----	420
Selenium	100	100	100	89	100	100	1.0	20	20
Silver	-----	-----	-----	-----	-----	-----	5.0	100	100
Zinc	7,500	7,500	2,800	2,498	2,800	2,800	-----	-----	2800
Organic Pollutants									
Benzene	-----	-----	-----	-----	-----	-----	0.5	10	10
Carbon tetrachloride	-----	-----	-----	-----	-----	-----	0.5	10	10
Chlordane	-----	-----	-----	-----	-----	-----	0.03	0.6	0.6
Chlorobenzene	-----	-----	-----	-----	-----	-----	100	2000	2000
Chloroform	-----	-----	-----	-----	-----	-----	6.0	120	120
Cresol, o-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, m-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, p-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresols	-----	-----	-----	-----	-----	-----	200	4000	4000
D, 2,4-	-----	-----	-----	-----	-----	-----	10.0	200	200
Dichlorobenzene, 1,4-	-----	-----	-----	-----	-----	-----	7.5	150	150
Dichloroethane, 1,2-	-----	-----	-----	-----	-----	-----	0.5	10	10
Dichloroethylene, 1,1-	-----	-----	-----	-----	-----	-----	0.7	14	14
Dinitrotoluene, 2,4-	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Endrin	-----	-----	-----	-----	-----	-----	0.02	0.4	0.4
Heptachlor	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Heptachlor epoxide	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Hexachlorobenzene	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	0.5	10	10
Hexachloroethane	-----	-----	-----	-----	-----	-----	3.0	60	60
Lindane	-----	-----	-----	-----	-----	-----	0.4	8.0	8
Methoxychlor	-----	-----	-----	-----	-----	-----	10	200	200
Methyl ethyl ketone	-----	-----	-----	-----	-----	-----	200	4000	4000
Nitrobenzene	-----	-----	-----	-----	-----	-----	2.0	40	40
Pentachlorophenol	-----	-----	-----	-----	-----	-----	100	2000	2000
Pyridine	-----	-----	-----	-----	-----	-----	5.0	100	100
Tetrachloroethylene	-----	-----	-----	-----	-----	-----	0.7	14	14
Toxaphene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichloroethylene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichlorophenol, 2,4,5-	-----	-----	-----	-----	-----	-----	400	8000	8000
Trichlorophenol, 2,4,6-	-----	-----	-----	-----	-----	-----	2.0	40	40
TP, 2,4,5- (Silvex)	-----	-----	-----	-----	-----	-----	1.0	20	20
Vinyl chloride	-----	-----	-----	-----	-----	-----	0.2	4	4

[a] For the application of biosolids to agricultural land, forest, public contact sites, reclamation sites, a POTW must comply with the Ceiling Concentrations and either the cumulative pollutant loading rates or the monthly average pollutant concentrations (also referred to as the "Clean Sludge" concentrations). Regulations from 40 CFR 503.13, Tables 1-4, October 25, 1995.

[b] Toxicity characteristic leaching procedure (TCLP) is a soil sample extraction method for chemical analysis employed as an analytical method to simulate leaching through a landfill. The testing methodology is used to determine if a waste is characteristically hazardous, i.e., classified as one of the "D" listed wastes by the USEPA. Sludge must comply with the TCLP Regulatory Levels in order to be disposed at a municipal landfill.

Table C4. Derivation of State Water Quality Standard for Metals for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Metal	Georgia WQS for Freshwater							
	Georgia WQS, Dissolved[a] (mg/L)		Conversion Factor (CF) for Acute (CMC)[a]	Conversion Factor (CF) for Chronic (CCC)[a]	Georgia WQS, Dissolved, Adjusted for Receiving Stream Hardness of 25 mg/L[b] (mg/L)		Georgia WQS, Total Recoverable, Adjusted for Receiving Stream Hardness of 25 mg/L[c] (mg/L)	
	Acute (CMC)	Chronic (CCC)			Acute (CMC)	Chronic (CCC)	Acute (CMC)	Chronic (CCC)
Arsenic[d]	0.34	0.15	1.000	1.000	0.34	0.15	0.34	0.15
Cadmium[d,e]	0.0010	0.00015	1.002	0.967	0.00052	0.000094	0.00052	0.000097
Chromium (III)[d,e]	0.32	0.042	0.316	0.86	0.18	0.024	0.579	0.028
Chromium (VI)[d]	0.0160	0.0110	0.982	0.962	0.0160	0.0110	0.0163	0.0114
Chromium, Total	----	----	----	----	----	----	----	----
Copper[d,e]	0.0070	0.0050	0.960	0.960	0.0036	0.0027	0.0038	0.0029
Cyanide	----	----	----	----	----	----	----	----
Lead[d,e]	0.030	0.0012	0.993	0.993	0.0139	0.00054	0.0140	0.00054
Mercury	0.0014	0.000012	0.85	0.85	0.0014	0.000012	0.0016	0.000014
Nickel[d,e]	0.26	0.029	0.998	0.997	0.145	0.016	0.145	0.016
Selenium	----	0.005	----	----	----	0.005	----	0.005
Silver	----	----	0.85	----	0.00030	----	0.00035	----
Zinc[d,e]	0.065	0.065	0.978	0.986	0.036	0.036	0.037	0.037

WQS = Water Quality Standard.

CMC = Criterion Maximum Concentration.

CCC = Criterion Continuous Concentration.

[a] Conversion Factors for Acute and Chronic Standards are from the National Recommended Water Quality Criteria, USEPA accessed 12/17/18 and available at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

[b] In-stream criteria for freshwater bodies are from Georgia Rule 391-3-6-.03(5)((3)ii). For those hardness-dependant metals, criteria are calculated from the following:
CMC (dissolved) = exp{mA [ln(hardness)]+ bA} (CF).
CCC (dissolved) = exp{mC [ln(hardness)]+ bC} (CF).

[c] For those metals reported in 391-3-6-.03 in terms of dissolved fraction, total recoverable critera are calculated from the following:
CMC (total) = CMC (dissolved) / CF.
CCC (total) = CCC (dissolved) / CF.

[d] Values are expressed in terms of the dissolved fraction in the water column.

[e] The freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body.

Table C5. Summary of Water Quality Standards for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Acute WQS	Most Stringent Chronic WQS
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS		
Conventional Pollutants (mg/L)							
Ammonia	----	----	----	----	----	----	----
Biochemical Oxygen Demand (BOD)	----	----	----	----	----	----	----
Chemical Oxygen Demand (COD)	----	----	----	----	----	----	----
Phosphorus, Total (as P)	----	----	----	----	----	----	----
Kjeldahl Nitrogen, Total (TKN)	----	----	----	----	----	----	----
Suspended Solids, Total (TSS)	----	----	----	----	----	----	----
Inorganic Pollutants (mg/L)							
Antimony	----	----	----	----	0.64	----	0.64
Arsenic	----	0.34	0.15	----	0.010	0.34	0.010
Cadmium	----	0.00052	0.000097	----	----	0.00052	0.000097
Chromium III	----	0.579	0.028	----	----	0.579	0.028
Chromium VI	----	0.016	0.0114	----	----	0.016	0.0114
Chromium, Total	----	----	----	----	----	----	----
Copper	----	0.0038	0.0029	----	----	0.0038	0.0029
Cyanide	----	----	----	0.0052	----	----	0.0052
Lead	----	0.0140	0.00054	----	----	0.0140	0.00054
Mercury	----	0.001647	0.000014	----	----	0.001647	0.000014
Molybdenum	----	----	----	----	----	----	----
Nickel	----	0.145	0.016	----	----	0.145	0.016
Selenium	----	----	0.005	----	----	----	0.005
Silver	----	0.00035	----	----	----	0.00035	----
Thallium	----	----	----	----	0.00047	----	0.00047
Zinc	----	0.037	0.037	----	----	0.037	0.037
Organic Pollutants (ug/L)							
Acenaphthene	----	----	----	----	990	----	990
Acrolein	----	----	----	----	9.3	----	9.3
Acrylonitrile	----	----	----	----	0.25	----	0.25
Aldrin	----	----	----	----	0.00005	----	0.00005
Anthracene	----	----	----	----	40,000	----	40000
Aroclor 1232 (PCBs)	----	----	----	0.014	----	----	0.014
Aroclor 1242 (PCBs)	----	----	----	0.014	----	----	0.014
Aroclor 1254 (PCBs)	----	----	----	0.014	----	----	0.014
Benzene	----	----	----	----	51	----	51
Benzidine	----	----	----	----	0.0002	----	0.0002
Benzo(a)Anthracene	----	----	----	----	0.018	----	0.018
Benzo(a)Pyrene	----	----	----	----	0.018	----	0.018
Benzo(k)Fluoroethene	----	----	----	----	0.018	----	0.018
Benzofluoranthene, 3,4-	----	----	----	----	0.018	----	0.018
BHC-Alpha, a-	----	----	----	----	0.0049	----	0.0049
BHC-Beta, b-	----	----	----	----	0.017	----	0.017
Bis(2-chloroethyl)Ether	----	----	----	----	0.53	----	0.53
Bis(2-chloroisopropyl)Ether	----	----	----	----	65,000	----	65,000
Bis(2-chloromethyl)Ether	----	----	----	----	----	----	----
Bis(2-ethylhexyl)Phthalate	----	----	----	----	2.2	----	2.2
Bromoform	----	----	----	----	140	----	140
Butylbenzyl Phthalate	----	----	----	----	1,900	----	1,900
Carbon Disulfide	----	----	----	----	----	----	----
Carbon Tetrachloride	----	----	----	----	1.6	----	1.6
Chlordane	----	----	----	0.0043	0.00081	----	0.00081
Chlorobenzene	----	----	----	----	1,600	----	1,600
Chlorodibromomethane	----	----	----	----	13	----	13
Chloroethane	----	----	----	----	----	----	----
Chloroform	----	----	----	----	470	----	470
Chloronaphthalene, 2-	----	----	----	----	1,600	----	1,600

Table C5. Summary of Water Quality Standards for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Acute WQS	Most Stringent Chronic WQS
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS		
Chlorophenol, 2-	----	----	----	----	150	----	150
Chrysene	----	----	----	----	0.018	----	0.018
DDD, 4,4'-	----	----	----	----	0.00031	----	0.00031
DDE, 4,4'-	----	----	----	----	0.00022	----	0.00022
DDT, 4,4'-	----	----	----	0.001	0.0002	----	0.00022
Dibenzo(a,h)Anthracene	----	----	----	----	0.018	----	0.018
Dichlorobenzene, 1,2-	----	----	----	----	1,300	----	1,300
Dichlorobenzene, 1,3-	----	----	----	----	960	----	960
Dichlorobenzene, 1,4-	----	----	----	----	190	----	190
Dichlorobenzidine, 3,3-	----	----	----	----	0.028	----	0.028
Dichlorobromomethane	----	----	----	----	17	----	17
Dichlorodifluoromethane	----	----	----	----	----	----	----
Dichlorofluoromethane	----	----	----	----	----	----	----
Dichloroethane, 1,1-	----	----	----	----	----	----	----
Dichloroethane, 1,2-	----	----	----	----	37	----	37
Dichloroethylene, 1,1-	----	----	----	----	7,100	----	7,100
Dichloroethylene, trans-1,2-	----	----	----	----	10,000	----	10,000
Dichlorophenol, 2,4-	----	----	----	----	290	----	290
Dichloropropane, 1,2-	----	----	----	----	15	----	15
Dichloropropylene, 1,3-	----	----	----	----	21	----	21
Dieldrin	----	----	----	0.056	0.000054	----	0.000054
Diethyl phthalate	----	----	----	----	44,000	----	44,000
Dimethyl phthalate	----	----	----	----	1,100,000	----	1,100,000
Dimethylphenol, 2,4-	----	----	----	----	850	----	850
Di-n-butyl phthalate	----	----	----	----	4,500	----	4,500
Dinitro-o-cresol, 4,6-	----	----	----	----	----	----	----
Dinitrophenol, 2,4-	----	----	----	----	5,300	----	5,300
Dinitrophenol, 2-Methyl-4,6-	----	----	----	----	280	----	280
Dinitrotoluene, 2,4-	----	----	----	----	3.4	----	3.4
Diphenylhydrazine, 1,2-	----	----	----	----	0.2	----	0.2
Endosulfan Sulfate	----	----	----	----	89	----	89
Endosulfan, alpha-	----	----	----	0.056	89	----	0.056
Endosulfan, beta-	----	----	----	0.056	89	----	0.056
Endrin	----	----	----	0.036	0.06	----	0.036
Endrin Aldehyde	----	----	----	----	0.3	----	0.3
Ethylbenzene	----	----	----	----	2,100	----	2,100
Fluoranthene	----	----	----	----	140	----	140
Fluorene	----	----	----	----	5,300	----	5,300
Formaldehyde	----	----	----	----	----	----	----
Heptachlor	----	----	----	0.0038	0.000079	----	0.000079
Heptachlor Epoxide	----	----	----	0.0038	0.000039	----	0.000039
Hexachlorobenzene	----	----	----	----	0.00029	----	0.00029
Hexachlorobutadiene	----	----	----	----	18	----	18
Hexachlorocyclopentadiene	----	----	----	----	1,100	----	1,100
Hexachloroethane	----	----	----	----	3.3	----	3.3
Indeno(1,2,3-cd)Pyrene	----	----	----	----	0.018	----	0.018
Isophorone	----	----	----	----	960	----	960
Lindane	----	0.95	----	----	1.8	0.95	1.8
Methyl Bromide (Bromomethane)	----	----	----	----	1,500	----	1,500
Methyl Chloride (Chloromethane)	----	----	----	----	----	----	----
Methyl ethyl ketone (2-Butanone)	----	----	----	----	----	----	----
Methyl isobutyl ketone (MIBK)	----	----	----	----	----	----	----
Methylene blue active substances (MBAS)	----	----	----	----	----	----	----
Methylene chloride	----	----	----	----	590	----	590

Table C5. Summary of Water Quality Standards for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	State WQS[a]						
	391-3-6-.03(5)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Acute WQS	Most Stringent Chronic WQS
	Chronic WQS	Acute WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS for Freshwaters	Chronic WQS		
Methoxychlor	----	----	----	----	0.03	----	0.03
Napthalene	----	----	----	----	----	----	----
Nitrobenzene	----	----	----	----	690	----	690
N-Nitrosodimethylamine	----	----	----	----	3.0	----	3.0
N-Nitrosodiphenylamine	----	----	----	----	6.0	----	6.0
Nonylphenol	----	----	----	----	----	----	----
PCBs	----	----	----	0.014	0.000064	----	0.000064
Pentachlorophenol	----	----	----	15	3.0	----	3.0
Phenanthrene	----	----	----	----	----	----	----
Phenol	----	----	----	300	857,000	----	300
Pyrene	----	----	----	----	4,000	----	4,000
Silvex (2,4,5-TP)	50	----	----	----	----	----	50
Tetrachloroethane, 1,1,2,2-	----	----	----	----	4.0	----	4.0
Tetrachloroethylene	----	----	----	----	3.3	----	3.3
Toluene	----	----	----	----	5,980	----	5,980
Toxaphene	----	----	----	0.0002	0.00028	----	0.00020
Trichlorobenzene, 1,2,4-	----	----	----	----	70	----	70
Trichloroethane, 1,1,1-	----	----	----	----	----	----	----
Trichloroethane, 1,1,2-	----	----	----	----	16	----	16
Trichloroethylene	----	----	----	----	30	----	30
Trichlorofluoromethane	----	----	----	----	----	----	----
Trichlorophenol, 2,4,6-	----	----	----	----	2.4	----	2.4
Vinyl Chloride	----	----	----	----	2.4	----	2.4
Other Pollutants							
Oil and Grease	----	----	----	----	----	----	----
Sulfide	----	----	----	----	----	----	----
Iodine	----	----	----	----	----	----	----
Surfactants	----	----	----	----	----	----	----
Sodium	----	----	----	----	----	----	----
Chloride	----	----	----	----	----	----	----
Hydrogen Sulfide	----	----	----	----	----	----	----

WQS = Water Quality Standard.

[a] In-stream criterion from Georgia Rule 391-3-6-.03, revised on October 22, 2015. For metals, values are expressed in terms of the total recoverable fraction in the water column (refer to Table D3).

Table C6. Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels[a]		Most Stringent Screening Level for Worker Protection (mg/L)
	Based on Fume Toxicity (mg/L)	Based on Explosivity (mg/L)	
Acrolein	0.047	13,163	0.047
Acrylonitrile	4.822	14,586	4.822
Benzene	0.014	169	0.014
Bromoform	0.227		0.227
Carbon Tetrachloride	0.011		0.011
Chlorobenzene	2.290	395	2.290
Chloroethane	5.880	222	5.880
Chloroform	0.060		0.060
Dichloroethane, 1,1-	1.685	909	1.685
Dichloroethane, 1,2-	0.168	5,221	0.168
Dichloroethylene, 1,1-	0.016	215	0.016
Dichloroethylene, trans-1,2-	2.040	571	2.040
Dichloropropane, 1,2-	4.289	1,326	4.289
Ethylbenzene	1.659	106	1.659
Hydrogen Cyanide	1.149	13,529	1.149
Hydrogen Sulfide	0.034	96	0.034
Methyl Bromide (Bromomethane)	0.305	1,521	0.305
Methyl Chloride (Chloromethane)	0.557	450	0.557
Methylene chloride	4.139	4,307	4.139
Tetrachloroethane, 1,1,2,2-	1.847		1.847
Toluene	2.075	152	2.075
Trichloroethane, 1,1,1-	2.759	591	2.759
Trichloroethane, 1,1,2-	1.601	9,611	1.601
Trichloroethylene	0.026	1,029	0.026
Vinyl Chloride	0.012	88	0.012

[a] Source: EPA Guidance Manual - Local Limits Development Guidance, Appendix I.

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Acrylonitrile	1.19	1794	1.19
Aldrin	0.38		0.38
Aroclor 1242	0.01		0.01
Aroclor 1254	0.005		0.005
Benzene	0.13	20	0.13
Bis(2-chloromethyl)Ether	0.0005		0.0005
Bromoform	0.24		0.24
Carbon Disulfide	0.06	6.3	0.06
Carbon Tetrachloride	0.03		0.03
Chlordane	1.27		1.27
Chlorobenzene	2.31	40	2.31
Chloroethane	0.42	1.6	0.42
Chloroform	0.41		0.41
Dichlorobenzene, 1,2-	3.75	165	3.75
Dichlorobenzene, 1,4-	3.55	104	3.55
Dichlorodifluoromethane	0.04		0.04
Dichloroethane, 1,1-	4.58	128	4.58
Dichloroethane, 1,2-	1.05	660	1.05
Dichloroethylene, 1,1-	0.003	3.3	0.003
Dichloroethylene, trans-1,2-	0.28	14	0.28
Dichloropropane, 1,2-	3.62	164	3.62
Dichloropropylene, 1,3-	0.08	435	0.08
Dieldrin	13		13
Diethyl phthalate	107		107
Dinitro-o-cresol, 4,6-	10.78		10.78
Dinitrotoluene, 2,4-	7.21		7.21
Endrin	4.9		4.9
Ethylbenzene	1.59	16	1.59
Formaldehyde	0.06	412	0.06
Heptachlor	0.003		0.003
Hexachlorobutadiene	0.0002		0.0002
Hexachlorocyclopentadiene	658		658
Hexachloroethane	0.093		0.093
Methyl Bromide (Bromomethane)	0.002	4.7	0.002
Methyl Chloride (Chloromethane)	0.06	1.1	0.06
Methyl ethyl ketone	249	2486	249
Methylene chloride	2.06	494	2.06
[illegible]	2.65	240	2.65

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Nitrobenzene	9.41	17046	9.41
Pentachlorophenol	4.37		4.37
Phenol	1,024		1,024
Tetrachloroethane, 1,1,2,2-	0.44		0.44
Tetrachloroethylene	0.53		0.53
Toluene	1.36	17	1.36
Toxaphene	0.003		0.003
Trichlorobenzene, 1,2,4-	0.39	197	0.39
Trichloroethane, 1,1,1-	1.55	33	1.55
Trichloroethane, 1,1,2-	1.15		1.15
Trichloroethylene	0.71	114	0.71
Trichlorofluoromethane	1.23		1.23
Vinyl Chloride	0.0003	2.2	0.0003

[a] Gas/Vapor Toxicity Screening Levels from Tables 4-2 and/or B-1 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

[b] Explosivity Screening Levels from Table 4-2 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

Appendix D: Maximum Allowable Headworks Loadings Analysis for the Rose Creek WPCP

Table D1. Maximum Allowable Headworks Loading Analysis for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

WPCP Name:	Rose Creek Water Pollution Control Plant
Date:	20-Feb-20
Average WPCP Flow (mgd):	10.00
Total Actual Industrial Flow (mgd):	1.00
Septic/Hauled Waste Flow (mgd):	0.004
Domestic/Commercial Flow (mgd):	9.00
Dry Sludge to Disposal (tons/day):	172
Dry Sludge to Disposal (lb/day):	341,395
Sludge Percent Solids (%)	NA
Specific Gravity of Sludge (kg/L)	NA
NPDES Permit Number:	GA0046451
NPDES Permitted Discharge (mgd):	10.0
Receiving Stream:	Etowah River Arm of Lake Allatoona
1Q10 Stream Flow (cfs):	195
1Q10 Stream Flow (mgd):	126
7Q10 Stream Flow (cfs):	283
7Q10 Stream Flow (mgd):	183
Stream Classification:	Fishing
Safety and Growth Factor (%):	10

Table D2. Local Limits Determination Based on Design Criteria for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Design Criteria (mg/L) (DC)	NPDES Permitted Flow (mgd) (Q_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{DESIGN})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Allowable Industrial Loading (lb/day) (AIL_{DESIGN})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}DESIGN}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants														
Ammonia	1.000	10.000	10.000	0.004		9.00	20.0	63	10	5291	1500	3262.1	391	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	0.004		9.00	178	488	10	40699	13376	23254	2788	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	0.004		9.00	398	1035	10	86282	29904	47750	5725	10
Phosphorus, Total (as P)	1.000	10.000	10.000	0.004		9.00	4.33	11.6	10	967	325	546	65	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	0.004		9.00	195	400	10	33360	14637	15387	1845	10
Inorganic Pollutants														
Antimony	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Arsenic	1.000	10.000	10.000	0.004	0.0083	9.00	0.001		10	-----	0.05	-----	-----	10
Cadmium	1.000	10.000	10.000	0.004	0.0011	9.00			10	-----	0	-----	-----	10
Chromium III	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Chromium VI	1.000	10.000	10.000	0.004		9.00	0.013		10	-----	0.98	-----	-----	10
Chromium, Total	1.000	10.000	10.000	0.004	0.0124	9.00	0.001		10	-----	0.10	-----	-----	10
Copper	1.000	10.000	10.000	0.004	0.2920	9.00	0.020		10	-----	1.5	-----	-----	10
Cyanide	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Lead	1.000	10.000	10.000	0.004	0.0096	9.00	0.001		10	-----	0.1	-----	-----	10
Mercury	1.000	10.000	10.000	0.004		9.00	0.000		10	-----	0.002	-----	-----	10
Molybdenum	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Nickel	1.000	10.000	10.000	0.004	0.0266	9.00	0.001		10	-----	0.10	-----	-----	10
Selenium	1.000	10.000	10.000	0.004	0.0063	9.00			10	-----	0	-----	-----	10
Silver	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Zinc	1.000	10.000	10.000	0.004	1.4500	9.00	0.138		10	-----	10.4	-----	-----	10
Organic Pollutants														
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	0.004		9.00	0.009		10	-----	0.68	-----	-----	10
Chloroform	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Other Pollutants														
Oil and Grease	1.000	10.000	10.000	0.004		9.00			10	-----	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	0.004		9.00		78	10	6505	0	5855	702	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(AIL_{DESIGN})	Allowable industrial loading to the WWTP in lb/day
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	($C_{LIM\text{-}DESIGN}$)	Local limits for industrial users in mg/L.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(SGF)	Safety and growth factor as a percent.
(DC)	The pollutant concentration the WWTP was designed to treat in mg/L.	8.34	Unit conversion factor.
(Q_{NPDES})	NPDES permitted flow for the POTW in mgd.		

Table D3. Local Limits Determination Based on Monthly NPDES Permit Levels for Rose Creek WPCP for Discharge to the Etowah River
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Pollutant Loading[a] (mg/L) (PL)	Domestic & Commercial Bkgd Conc.[a,b] (mg/L) (C_{DOM})	Septic/Hauled Waste Conc.[a,c] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WWTP})	NPDES Monthly Limit for Discharge (mg/L) (C_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{NPDES})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{NPDES})	Industrial Local Limit (mg/L) ($C_{LIM-NPDES}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																
Ammonia	1.000	10.000	10.000	9.000	0.004	19.98	20.0		99.24	0.80	8779	1500	0	6401	768	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	9.000	0.004	178	178		99.07	4.00	35871	13376	0	18908	2267	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	9.000	0.004	398	398				-----	29904	0	-----	-	10
Phosphorus, Total (as P)	1.000	10.000	10.000	9.000	0.004	4.33	4.33		97.45	0.20	654	325	0	264	32	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	9.000	0.004	195	195		99.44	20.0	297857	14637	0	253435	30388	10
Inorganic Pollutants																
Antimony	1.000	10.000	10.000	9.000	0.004						-----	0	0	-----	-	10
Arsenic	1.000	10.000	10.000	9.000	0.004	0.0007	0.0007	0.008	20.69		-----	0.05	0.00028	-----	-	10
Cadmium	1.000	10.000	10.000	9.000	0.004			0.001	50		-----	0	0.00004	-----	-	10
Chromium III	1.000	10.000	10.000	9.000	0.004				72		-----	0	0	-----	-	10
Chromium VI	1.000	10.000	10.000	9.000	0.004	0.0130	0.0130		61.54		-----	0.98	0	-----	-	10
Chromium, Total	1.000	10.000	10.000	9.000	0.004	0.0013	0.0013	0.012	81.13		-----	0.10	0.00041	-----	-	10
Copper	1.000	10.000	10.000	9.000	0.004	0.0201	0.0201	0.292	92.64		-----	1.50	0.00974	-----	-	10
Cyanide	1.000	10.000	10.000	9.000	0.004				66		-----	0	0	-----	-	10
Lead	1.000	10.000	10.000	9.000	0.004	0.00105	0.00105	0.010	94.05		-----	0.08	0.00032	-----	-	10
Mercury	1.000	10.000	10.000	9.000	0.004	0.00003	0.00003		33.33		-----	0.002	0	-----	-	10
Molybdenum	1.000	10.000	10.000	9.000	0.004				29		-----	0	0	-----	-	10
Nickel	1.000	10.000	10.000	9.000	0.004	0.0013	0.0013	0.027	26.42		-----	0.10	0.00089	-----	-	10
Selenium	1.000	10.000	10.000	9.000	0.004			0.006	50		-----	0	0.00021	-----	-	10
Silver	1.000	10.000	10.000	9.000	0.004				62		-----	0	0	-----	-	10
Zinc	1.000	10.000	10.000	9.000	0.004	0.1380	0.1380	1.450	48.55		-----	10.4	0.04837	-----	-	10
Organic Pollutants																
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	9.000	0.004	0.0323	0.0060		86.82		-----	0.45	0	-----	-	10
Chloroform	1.000	10.000	10.000	9.000	0.004	0.0017	0.0090		53		-----	0.68	0	-----	-	10
Other Pollutants																
Oil and Grease	1.000	10.000	10.000	9.000	0.004						-----	0	0	-----	-	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	9.000	0.004	43			98.11		-----	0	0	-----	-	10

[a] Values in red are literature values.

[b] If the domestic and commercial background concentration was greater than the pollutant loading, the pollutant loading was used as the domestic and commercial background concentration. If the domestic and commercial background concentration was greater than a non-detect pollutant loading, the domestic and commercial background concentration was assumed to be negligible.

[c] Values in red are literature values from Appendix L from the USEPA Local Limits Development Guidance Document Appendices.

(Q_{IND})	Industrial flow in mgd.	(R_{WWTP})	Removal efficiency across WWTP as a percent.	(SGF)	Safety and growth factor as a percent.
(Q_{EFF})	WWTP's average flow in mgd.	(C_{NPDES})	NPDES monthly average permit limit for a particular pollutant in mg/L.	8.34	Unit conversion factor.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{NPDES})	Allowable headworks pollutant loading to the WWTP in lb/day.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.		
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.		
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{NPDES})	Allowable industrial loading to the WWTP in lb/day.		
(PL)	Pollutant concentration in influent in mg/L.	($C_{LIM-NPDES}$)	Local limits for industrial users in mg/L.		

Table D4. Local Limits Determination Based on Activated Sludge Inhibition Threshold Levels for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{PRIM})	A.S. Inhibition Level (mg/L) (C_{INHIB1})	Allowable Headworks Loading (lb/day) (AHL_{SEC1})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC1})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC1}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.000	10.000	10.000	8.996	19.98	0.004			480	40032	1499.03	0	34530	4140	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	8.996	178.20	0.004				-----	13369.75	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	8.996	398.400	0.004				-----	29891	0	-----	-----	10
Phosphorus, Total (as P)	1.000	10.000	10.000	8.996	4.326	0.004				-----	325	0	-----	-----	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	8.996	195.00	0.004				-----	14630.19	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Arsenic	1.000	10.000	10.000	8.996	0.0007	0.004	0.01		0.1	8.3	0.05	0.00028	7.5	0.89	10
Cadmium	1.000	10.000	10.000	8.996		0.004	0.001	15	5.5	540	0	0.00004	486	58.24	10
Chromium III	1.000	10.000	10.000	8.996		0.004			30	2502	0	0	2252	270.0	10
Chromium VI	1.000	10.000	10.000	8.996	0.013	0.004			1	83	0.98	0	74	8.88	10
Chromium, Total	1.000	10.000	10.000	8.996	0.0013	0.004	0.01	27	50.5	5769	0.10	0.00041	5192	622.59	10
Copper	1.000	10.000	10.000	8.996	0.0201	0.004	0.29	22	1	107	1.5	0.00974	95	11.36	10
Cyanide	1.000	10.000	10.000	8.996		0.004		27	2.55	291.3	0	0	262.20	31.44	10
Lead	1.000	10.000	10.000	8.996	0.0011	0.004	0.01	57	2.55	494.6	0.1	0.00032	445.04	53.36	10
Mercury	1.000	10.000	10.000	8.996	0.00003	0.004		10	0.55	51.0	0.002	0	45.9	5.50	10
Molybdenum	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Nickel	1.000	10.000	10.000	8.996	0.0013	0.004	0.03	14	1.75	170	0.10	0.00089	153	18.30	10
Selenium	1.000	10.000	10.000	8.996		0.004	0.01			-----	0	0.00021	-----	-----	10
Silver	1.000	10.000	10.000	8.996		0.004		20	2.625	273.7	0	0	246.3	29.53	10
Zinc	1.000	10.000	10.000	8.996	0.138	0.004	1.45	27	2.9	331	10.4	0.04837	288	34.5	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	8.996	0.0060	0.004				-----	0.45	0	-----	-----	10
Chloroform	1.000	10.000	10.000	8.996	0.0090	0.004		14		-----	0.68	0	-----	-----	10
Other Pollutants															
Oil and Grease	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WWTP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WWTP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table D5. Local Limits Determination Based on Nitrification Inhibition Threshold Levels for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{SEC})	Nitrification Inhibition Level (mg/L) (C_{INHIB2})	Allowable Headworks Loading (lb/day) (AHL_{SEC2})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC2})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC2}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.000	10.000	10.000	8.996	19.98	0.004				-----	1499	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	8.996	178.20	0.004				-----	13370	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	8.996	398.400	0.004				-----	29891	0	-----	-----	10
Phosphorus, Total (as P)	1.000	10.000	10.000	8.996	4.326	0.004				-----	325	0	-----	-----	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	8.996	195.00	0.004				-----	14630	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Arsenic	1.000	10.000	10.000	8.996	0.0007	0.004	0.01		1.5	125	0.05	0.00028	112.54	13.49	10
Cadmium	1.000	10.000	10.000	8.996		0.004	0.001	15	5.2	510	0	0.00004	459.19	55.06	10
Chromium III	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Chromium VI	1.000	10.000	10.000	8.996	0.013	0.004			5.5	458.7	0.98	0	411.85	49.38	10
Chromium, Total	1.000	10.000	10.000	8.996	0.0013	0.004	0.01	27	1.075	122.8	0.10	0.00041	110.43	13.24	10
Copper	1.000	10.000	10.000	8.996	0.0201	0.004	0.29	22	0.265	28.3	1.5	0.00974	23.987	2.876	10
Cyanide	1.000	10.000	10.000	8.996		0.004		27	0.42	48.0	0	0	43.19	5.18	10
Lead	1.000	10.000	10.000	8.996	0.001	0.004	0.01	57	0.5	97.0	0.1	0.00032	87.20	10.46	10
Mercury	1.000	10.000	10.000	8.996	0.00003	0.004		10		-----	0.002	0	-----	-----	10
Molybdenum	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Nickel	1.000	10.000	10.000	8.996	0.0013	0.004	0.03	14	0.375	36.4	0.10	0.00089	32.63	3.91	10
Selenium	1.000	10.000	10.000	8.996		0.004	0.01			-----	0	0.00021	-----	-----	10
Silver	1.000	10.000	10.000	8.996		0.004		20		-----	0	0	-----	-----	10
Zinc	1.000	10.000	10.000	8.996	0.138	0.004	1.45	27	0.29	33.1	10.4	0.04837	19.42	2.33	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	8.996	0.0060	0.004				-----	0.45	0	-----	-----	10
Chloroform	1.000	10.000	10.000	8.996	0.0090	0.004		14	10	970	0.68	0	872.12	104.57	10
Other Pollutants															
Oil and Grease	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	8.996		0.004				-----	0	0	-----	-----	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WWTP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WWTP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor.

Table D6. Local Limits Determination Based on Sludge Disposal for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Dry Sludge to Disposal (lbs/day) (Q_{SLUDGE})	Removal Efficiency[a] (%) (R_{WWTP})	Sludge Criteria (mg/kg) (C_{SLUDGE})	Allowable Headworks Loading (lbs/day) (AHL_{SLUDGE})	Domestic & Commercial Loading (lbs/day) (L_{UNC})	Septic/Hauled Waste Loading (lbs/day) (L_{HW})	Allowable Industrial Loading (lbs/day) (AIL_{SLUDGE})	Industrial Local Limit (mg/L) ($C_{LIM-SLUDGE}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	1.000	10.000	8.996	19.98	0.004		341,395	99.24		-----	1499	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	8.996	178.20	0.004		341,395	99.07		-----	13370	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.000	10.000	8.996	398.400	0.004		341,395			-----	29891	0	-----	-----	10
Phosphorus, Total (as P)	1.000	10.000	8.996	4.326	0.004		341,395	97.45		-----	325	0	-----	-----	10
Suspended Solids, Total (TSS)	1.000	10.000	8.996	195.00	0.004		341,395	99.44		-----	14630	0	-----	-----	10
Inorganic Pollutants															
Antimony	1.000	10.000	8.996		0.004		341,395			-----	0	0	-----	-----	10
Arsenic	1.000	10.000	8.996	0.0007	0.004	0.01	341,395	20.69	41	67.571	0.05	0.00028	60.76	7.285	10
Cadmium	1.000	10.000	8.996		0.004	0.001	341,395	50	20	13.639	0	0.00004	12.28	1.47	10
Chromium III	1.000	10.000	8.996		0.004		341,395	72	100	47.36	0	0	42.62	5.11	10
Chromium VI	1.000	10.000	8.996	0.013	0.004		341,395	61.54	100	55.41	0.98	0	48.89	5.86	10
Chromium, Total	1.000	10.000	8.996	0.0013	0.004	0.01	341,395	81.13	100	42.03	0.10	0.00041	37.73	4.52	10
Copper	1.000	10.000	8.996	0.0201	0.004	0.29	341,395	92.64	1500	552.1	1.5	0.00974	495.39	59.40	10
Cyanide	1.000	10.000	8.996		0.004		341,395	66		-----	0	0	-----	-----	10
Lead	1.000	10.000	8.996	0.0011	0.004	0.01	341,395	94.05	100	36.26	0.1	0.00032	32.55	3.90	10
Mercury	1.000	10.000	8.996	0.00003	0.004		341,395	33.33	4	4.092	0.002	0	3.68	0.44	10
Molybdenum	1.000	10.000	8.996		0.004		341,395	29	75	88.19	0	0	79.37	9.52	10
Nickel	1.000	10.000	8.996	0.0013	0.004	0.03	341,395	26.42	420	542.1	0.10	0.00089	487.76	58.48	10
Selenium	1.000	10.000	8.996		0.004	0.01	341,395	50	20	13.639	0	0.00021	12.28	1.47	10
Silver	1.000	10.000	8.996		0.004		341,395	62	100	55.00	0	0	49.50	5.93	10
Zinc	1.000	10.000	8.996	0.138	0.004	1.45	341,395	48.55	2800	1966.5	10.4	0.04837	1759.49	210.97	10
Organic Pollutants															
Bis(2-ethylhexyl)Phthalate	1.000	10.000	8.996	0.0060	0.004		341,395	86.82		-----	0.45	0	-----	-----	10
Chloroform	1.000	10.000	8.996	0.0090	0.004		341,395	53	120	77.20	0.68	0	68.81	8.25	10
Other Pollutants															
Oil and Grease	1.000	10.000	8.996		0.004		341,395			-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	8.996		0.004		341,395	98.11		-----	0	0	-----	-----	10

[a] Polluant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WWTP in lbs/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lbs/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lbs/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WWTP in lbs/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table D7. Local Limits Determination Based on Acute State Water Quality Standards for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WWTP})	Stream Flow (mgd) (Q_{ASTR})	Upstream Conc. (mg/L) (C_{STR})	Acute State WQS[a] (mg/L) (CA_{WQS})	Allowable Headworks (lb/day) ($AHLA_{WQS}$)	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) ($AILA_{WQS}$)	Industrial Local Limit (mg/L) ($C_{LIM-AWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	1.000	10.000	10.000	8.996	19.98	0.004		99	126			-----	1499	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	8.996	178.20	0.004		99.07	126	1.07		-----	13370	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	8.996	398.400	0.004			126			-----	29891	0	-----	-----	10
Phosphorus, Total (as P)	1.000	10.000	10.000	8.996	4.326	0.004		97.45	126	0.056		-----	325	0	-----	-----	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	8.996	195.00	0.004		99.44	126	27.91		-----	14630	0	-----	-----	10
Inorganic Pollutants																	
Antimony	1.000	10.000	10.000	8.996		0.004			126			-----	0	0	-----	-----	10
Arsenic	1.000	10.000	10.000	8.996	0.0007	0.004	0.01	20.69	126		0.34000	486	0.05	0.00028	438	52	10
Cadmium	1.000	10.000	10.000	8.996		0.004	0.001	50	126		0.00052	1.18	0	0.00004	1.06	0.128	10
Chromium III	1.000	10.000	10.000	8.996		0.004		72	126		0.579	2347	0	0	2112	253	10
Chromium VI	1.000	10.000	10.000	8.996	0.013	0.004		61.54	126		0.016	48.06	0.98	0	42.28	5.069	10
Chromium, Total	1.000	10.000	10.000	8.996	0.0013	0.004	0.01	81.13	126			-----	0.10	0.00041	-----	-----	10
Copper	1.000	10.000	10.000	8.996	0.0201	0.004	0.29	92.64	126	0.087	0.0038	-1183.94	1.50	0.00974	-1067.06	-127.95	10
Cyanide	1.000	10.000	10.000	8.996		0.004		66	126			-----	0	0	-----	-----	10
Lead	1.000	10.000	10.000	8.996	0.001	0.004	0.01	94.05	126	0.002	0.0140	231.2	0.08	0.00032	208.0	24.94	10
Mercury	1.000	10.000	10.000	8.996	0.00003	0.004		33.33	126		0.0016	2.8	0.002	0	2.5	0.30	10
Molybdenum	1.000	10.000	10.000	8.996		0.004		29	126			-----	0	0	-----	-----	10
Nickel	1.000	10.000	10.000	8.996	0.0013	0.004	0.03	26.42	126		0.145	224	0.10	0.00089	201	24	10
Selenium	1.000	10.000	10.000	8.996		0.004	0.01	50	126			-----	0	0.00021	-----	-----	10
Silver	1.000	10.000	10.000	8.996		0.004		62	126		0.00035	1.04	0	0	0.937	0.1123	10
Zinc	1.000	10.000	10.000	8.996	0.138	0.004	1.45	48.55	126	0.02	0.037	41	10.4	0.04837	26	3.15	10
Organic Pollutants																	
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	8.996	0.0060	0.004		86.82	126			-----	0.45	0	-----	-----	10
Chloroform	1.000	10.000	10.000	8.996	0.0090	0.004		53	126			-----	0.68	0	-----	-----	10
Other Pollutants																	
Oil and Grease	1.000	10.000	10.000	8.996		0.004			126			-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	8.996		0.004		98.11	126			-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WWTP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WWTP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WWTP's average flow.	($C_{LIM-WQS}$)	Local limits for industrial users in mg/L.
(R_{WWTP})	Removal efficiency across WWTP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D8. Local Limits Determination Based on Chronic State Water Quality Standards for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	IU Flow (mgd) (Q_{IND})	WWTP Effluent Flow (mgd) (Q_{EFF})	WWTP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{POTW})	Stream Flow (mgd) (Q_{CSTR})	Upstream Conc. (mg/L) (C_{STR})	Chronic State WQS[a] (mg/L) (C_{CWQS})	Allowable Headworks (lb/day) (AHL_{CWQS})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{CWQS})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}CWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	1.000	10.000	10.000	8.996	19.98	0.004		99	183	0		-----	1499	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	1.000	10.000	10.000	8.996	178.20	0.004		99.07	183	1.07		-----	13370	0	-----	-----	10
Chemical Oxygen Demand (COD)	1.000	10.000	10.000	8.996	398.400	0.004			183			-----	29891	0	-----	-----	10
Phosphorus, Total (as P)	1.000	10.000	10.000	8.996	4.326	0.004		97.45	183	0.056		-----	325	0	-----	-----	10
Suspended Solids, Total (TSS)	1.000	10.000	10.000	8.996	195.00	0.004		99.44	183	27.91		-----	14630	0	-----	-----	10
Inorganic Pollutants																	
Antimony	1.000	10.000	10.000	8.996		0.004			183	0	0.64	1030	0	0	927	111.11	10
Arsenic	1.000	10.000	10.000	8.996	0.0007	0.004	0.01	20.69	183	0	0.01	20.28	0.05	0.00028	18.201	2.18	10
Cadmium	1.000	10.000	10.000	8.996		0.004	0.001	50	183	0	0.000097	0.312	0	0.00004	0.281	0.03	10
Chromium III	1.000	10.000	10.000	8.996		0.004		72	183	0	0.028	159	0	0	143.182	17.1681	10
Chromium VI	1.000	10.000	10.000	8.996	0.013	0.004		61.54	183	0	0.0114	47.83	0.98	0	42.07	5.04	10
Chromium, Total	1.000	10.000	10.000	8.996	0.0013	0.004	0.01	81.13	183	0		-----	0.10	0.00041	-----	-----	10
Copper	1.000	10.000	10.000	8.996	0.0201	0.004	0.29	92.64	183	0.087	0.0029	-1740.686	1.5	0.00974	-1568.13	-188.0253	10
Cyanide	1.000	10.000	10.000	8.996		0.004		66	183	0	0.0052	24.6	0	0	22.144	2.655	10
Lead	1.000	10.000	10.000	8.996	0.001	0.004	0.01	94.05	183	0.002	0.00054	-36.5424	0.1	0.00032	-32.97	-3.95	10
Mercury	1.000	10.000	10.000	8.996	0.00003	0.004		33.33	183	0	0.000014	0.034	0.002	0	0.0284	0.0034	10
Molybdenum	1.000	10.000	10.000	8.996		0.004		29	183	0		-----	0	0	-----	-----	10
Nickel	1.000	10.000	10.000	8.996	0.0013	0.004	0.03	26.42	183	0	0.016	35.298	0.10	0.00089	31.668	3.80	10
Selenium	1.000	10.000	10.000	8.996		0.004	0.01	50	183	0	0.005	16.1	0	0.00021	14.48	1.736	10
Silver	1.000	10.000	10.000	8.996		0.004		62	183	0		-----	0	0	-----	-----	10
Zinc	1.000	10.000	10.000	8.996	0.138	0.004	1.45	48.55	183	0.02	0.037	56	10.4	0.04837	40	4.84	10
Organic Pollutants																	
Bis(2-ethylhexyl)Phthalate	1.000	10.000	10.000	8.996	0.0060	0.004		86.82	183	0	0.0022	27	0.45	0	24	2.84	10
Chloroform	1.000	10.000	10.000	8.996	0.0090	0.004		53	183	0	0.47	1609	0.68	0	1447	173.52	10
Other Pollutants																	
Oil and Grease	1.000	10.000	10.000	8.996		0.004			183	0		-----	0	0	-----	-----	10
Kjeldahl Nitrogen, Total (TKN)	1.000	10.000	10.000	8.996		0.004		98.11	183	0		-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WWTP's permitted flow in mgd.
(Q_{EFF})	WWTP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WWTP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WWTP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WWTP's average flow.	($C_{LIM\text{-}WQS}$)	Local limits for industrial users in mg/L.
(R_{WWTP})	Removal efficiency across WWTP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D9. Summary of Allowable Headworks Loadings (AHLs) for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority							
Pollutant	Allowable Headworks Loadings (lb/day)						
	Design Criteria (AHL_{DESIGN})	NPDES Discharge Permit Limits (AHL_{NPDES})	Activated Sludge Treatment Inhibition (AHL_{SEC1})	Nitrification Treatment Inhibition (AHL_{SEC2})	Sludge Disposal (AHL_{SLUDGE})	Acute Water Quality Standards (AHL_{AWQS})	Chronic Water Quality Standards (AHL_{CWQS})
Conventional Pollutants							
Ammonia	5,291	8,779	40,032	-----	-----	-----	-----
Biochemical Oxygen Demand (BOD)	40,699	35,871	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	86,282.3	-----	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	967.4	654.1	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	33,360	297,857	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	1,029.60
Arsenic	-----	-----	8.340	125.10	67.571	486.33	20.284
Cadmium	-----	-----	539.6	510.2	13.639	1.182	0.312
Chromium III	-----	-----	2502	-----	47.359	2,347.2	159.091
Chromium VI	-----	-----	83.40	458.7	55.409	48.059	47.829
Chromium, Total	-----	-----	5769.45	122.82	42.029	-----	-----
Copper	-----	-----	106.92	28.33	552.113	-1,183.945	-1,740.686
Cyanide	-----	-----	291.3	47.98	-----	-----	24.604
Lead	-----	-----	494.6	96.98	36.256	231.215	-36.542
Mercury	-----	-----	50.97	-----	4.092	2.803	0.0341
Molybdenum	-----	-----	-----	-----	88.186	-----	-----
Nickel	-----	-----	169.71	36.37	542.066	223.877	35.298
Selenium	-----	-----	-----	-----	13.639	-----	16.087
Silver	-----	-----	273.7	-----	54.998	1.041	-----
Zinc	-----	-----	331.3	33.13	1966.5	40.761	56.448
Organic Pollutants							
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	26.853
Chloroform	-----	-----	-----	970	77.204	-----	1608.74
Other Pollutants							
Oil and Grease	-----	-----	-----	-----	-----	-----	-----
Kjeldahl Nitrogen, Total (TKN)	6,505	-----	-----	-----	-----	-----	-----

Table D10. Summary of Allowable Industrial Loadings (AILs) for Rose Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Cherokee County Water and Sewerage Authority							
Pollutant	Allowable Industrial Loadings (lb/day)						
	Design Criteria	NPDES Discharge Permit Limits	Activated Sludge Treatment Inhibition	Nitrification Treatment Inhibition	Sludge Disposal	Acute Water Quality Standards	Chronic Water Quality Standards
	(AIL_{DESIGN})	(AIL_{NPDES})	(AIL_{SEC1})	(AIL_{SEC2})	(AIL_{SLUDGE})	(AHL_{AWQS})	(AHL_{CWQS})
Conventional Pollutants							
Ammonia	3,262	6,401	34,530	-----	-----	-----	-----
Biochemical Oxygen Demand (BOD)	23,254	18,908	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	47,750	-----	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	546	264	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	15,387	253,435	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	927
Arsenic	-----	-----	7.45	113	60.759	438	18.201
Cadmium	-----	-----	485.7	459	12.275	1.06	0.28
Chromium III	-----	-----	2252	-----	42.62	2,112	143
Chromium VI	-----	-----	74.1	411.9	48.892	42.28	42.071
Chromium, Total	-----	-----	5192.4	110.4	37.727	-----	-----
Copper	-----	-----	94.7	24.0	495.4	-1067.06	-1568.13
Cyanide	-----	-----	262.20	43.2	-----	-----	22.1
Lead	-----	-----	445.04	87.2	32.55	208.0	-32.97
Mercury	-----	-----	45.87	-----	3.681	2.5	0.028
Molybdenum	-----	-----	-----	-----	79.37	-----	-----
Nickel	-----	-----	152.6	32.6	487.8	201	31.67
Selenium	-----	-----	-----	-----	12.275	-----	14.5
Silver	-----	-----	246.3	-----	49.50	0.937	-----
Zinc	-----	-----	288	19.42	1,759.5	26	40
Organic Pollutants							
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	23.7
Chloroform	-----	-----	-----	872	68.81	-----	1,447
Other Pollutants							
Oil and Grease	-----	-----	-----	-----	-----	-----	-----
Kjeldahl Nitrogen, Total (TKN)	5,855	-----	-----	-----	-----	-----	-----

Table D11. Maximum Allowable Headworks Loadings and Local Limits for Rose Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Cherokee County Water and Sewerage Authority

Pollutant	Most Stringent Criterion	Maximum Allowable Headworks Loadings			Maximum Allowable Industrial Loadings			Local Limit Needed?	Calculated Industrial Local Limit (mg/L)	Worker Protection Screening Level[c] (mg/L)	Domestic/ Commercial Background Levels[d] (mg/L)	Final Industrial Local Limit[e] (mg/L)
		Calculated MAHL (lbs/day)	Current Influent Loading Based on Actual Flow[a] (lb/day)	Percent of MAHL Currently in Use[b] (%)	Calculated MAIL (lbs/day)	Current Industrial Loading Based on Actual Flow[a] (lb/day)	Percent of MAIL Currently in Use[b] (%)					
Conventional Pollutants												
Ammonia	Design Criteria	5,291	1,666	31.5%	3,262			Yes	391	-----		63
Biochemical Oxygen Demand (BOD)	Design Criteria	35,871	14,862	41.4%	18,908			Yes	2,267	-----		488
Chemical Oxygen Demand (COD)	Design Criteria	86,282	33,227	38.5%	47,750	3521	7.37%	Yes	5725	-----		1,035
Phosphorus, Total (as P)	Design Criteria	654	361	55.2%	264			Yes	31.7	-----		11.6
Suspended Solids, Total (TSS)	Design Criteria	33,360	16,263	48.8%	15,387	358	2.33%	Yes	1,845	-----		400
Inorganic Pollutants												
Antimony	Chronic State WQS	1,030			927				111	-----		111
Arsenic	Activated Sludge Treatment Inhibition	8.340	0.06047	0.73%	7.451			Yes	0.893	-----		0.893
Cadmium	Chronic State WQS	0.312			0.281			Yes	0.034	-----		0.034
Chromium III	Sludge Disposal	47.36			42.62			Yes	5.111	-----		5.11
Chromium VI	Chronic State WQS	47.83	*1.08420*		42.071			Yes	5.045	-----		5.04
Chromium, Total	Sludge Disposal	42.03	0.111	0.26%	37.727				4.524	-----		4.52
Copper	Chronic State WQS	-1,740.7	1.672	-0.1%	-1,568.13			Yes	-188.025	-----	0.0201	0.02
Cyanide	Chronic State WQS	24.60			22.14			Yes	2.655	-----		2.66
Lead	Chronic State WQS	-36.542	0.088	-0.24%	-32.97			Yes	-3.953	-----	0.0011	0.001
Mercury	Chronic State WQS	0.034	0.0025	7.3%	0.028			Yes	0.003	-----		0.003
Molybdenum	Sludge Disposal	88.19			79.37				9.52	-----		9.52
Nickel	Chronic State WQS	35.30	0.11051	0.3%	31.668			Yes	3.80	-----		3.80
Selenium	Sludge Disposal	13.64			12.275			Yes	1.47	-----		1.47
Silver	Acute State WQS	1.04			0.937			Yes	0.112	-----		0.11
Zinc	Nitrification Treatment Inhibition	33.1	11.51	34.7%	19.42			Yes	2.33	-----		2.33
Organic Pollutants												
Bis(2-ethylhexyl)Phthalate	Chronic State WQS	26.9	*2.68965*	10.0%	23.7			Yes	2.84	-----		2.84
Chloroform	Sludge Disposal	77.20	*0.1418*	0.18%	68.81			Yes	8.250	-----		8.25
Other Pollutants												
Oil and Grease	Chronic State WQS	927			834	51	6.1%	Yes	100	-----		100
Kjeldahl Nitrogen, Total (TKN)	Design Criteria	6,505	*3588.30075*	55.2%	5,855			Yes	702	-----		78

[a] Influent loadings are provided only for those parameters detected in influent samples.

[b] MAHL and MAIL utilizations are calculated only for those pollutants detected in the influent and industrial effluent, respectively.

[c] Worker Protection Screening Levels are the most stringent of discharge screening levels based on fume toxicity and explosivity. Refer to Table C6. Secondary source for worker protection screening level is provided in Table C7.

[d] Domestic/commercial background levels are provided only for those parameters with negative calculated local limits.

[e] Industrial local limits are the more stringent of the calculated industrial local limits and Worker Protection Screening Levels. In the case of negative local limits where domestic/commercial background levels are not available, the laboratory practical quantitation limit was used.